

The People's Republic of China

**National Implementation Plan for the Stockholm
Convention on Persistent Organic Pollutants**

April 2007

Description

Pursuant to the provisions of Article 7 of the Stockholm Convention on Persistent Organic Pollutants, China developed and now transmits to the Conference of the Parties *China's National Implementation Plan for the Stockholm Convention on Persistent Pollutants* (NIP).

This NIP is divided into three parts: Part I is the implementation plan of the Chinese Central Government for the Stockholm Convention on Persistent Organic Pollutants; Part II is the implementation plan of the Hong Kong Special Administrative Region developed by the Government of the Hong Kong Special Administrative Region; and Part III is the implementation plan of the Macao Special Administrative Region developed by the Government of the Macao Special Administrative Region.

This NIP was developed in accordance with the *Interim Guidance for Developing a National Implementation Plan for the Stockholm Convention* adopted by the Conference of the Parties

The People's Republic of China

National Implementation Plan for the Stockholm
Convention on Persistent Organic Pollutants

Part I

(Implementation Plan of the Chinese Central Government for the
Stockholm Convention on Persistent Organic Pollutants)

Contents

Executive Summary	1
Government's commitment to Convention implementation	1
Main targets and contents of the Convention	2
Hazards and impacts of POPs in China	2
Priorities and action objectives for Convention implementation	3
Objectives by 2010:	4
Objectives by 2015:	5
Long-term objectives:	5
Action and financial needs for NIP implementation	6
Chapter 1 Introduction	10
1.1 Background	10
1.2 Purpose and contents	12
1.3 Development principles and process	13
1.3.1 Development principles	13
1.3.2 Development process	14
1.4 Updating and amendment of the NIP	16
Chapter 2 Basic Situation of the Country	17
2.1 Country profile	17
2.1.1 Geography and population	17
2.1.2 Political and economic profile	19
2.1.3 Sector economy profile	20
2.1.4 Profile of natural resources and the environment	21
2.2 Institutional, policy and regulatory framework	24
2.2.1 Environmental policies, sustainable development policies and general regulatory framework	24
2.2.2 Responsibilities of government departments involved in POPs management	27
2.2.3 Related international commitments and obligations	31
2.2.4 Laws and regulations related to POPs	32
2.2.5 Critical approaches and procedures in the management of POPs chemicals and pesticides	35
2.3 Evaluation of the status quo for POPs	36
2.3.1 Pesticide POPs in Annex A of the convention	36
2.3.2 PCBs in Annex A of the convention	44
2.3.3 Chemicals in Annex B of the convention	49
2.3.4 The chemicals listed in Annex C of the Convention	54
2.3.5 Stockpiles, Wastes and Contaminated Sites	74
2.3.6 Control of POPs production and use for exemptions and for acceptable purposes	82
2.3.7 Existing programmes for POPs release monitoring, environmental and human health impacts	82
2.3.8 Environmental Consciousness and Information Exchange	83
2.3.9 Relevant activities of non-governmental organizations	84
2.3.10 Basic situation of monitoring and R& D	85
2.3.11 Affected groups and environments	85

2.3.12	Evaluation and registration of new chemicals.....	86
2.3.13	Evaluation and management of existing chemicals	86
2.4	Requirements analysis on management of convention implementation	87
Chapter 3	Strategy and Action Plan.....	89
3.1	National Strategy	89
3.1.1	Overall objective.....	89
3.1.2	Priority Areas	90
3.1.3	Specific objectives	90
	Objectives by 2010	90
	Objectives by 2015	91
	Long-term objectives	92
3.2	Implementation measures	92
3.3	Action plan.....	94
3.3.1	Building of institutional capacity and development of policies and regulations.....	94
3.3.2	Measures to reduce or eliminate releases from intentional POPs production and use.....	99
3.3.3	Actions for the reduction or elimination of the intentionally produced and used pesticide POPs listed in Part I of Annex A under the Convention	100
3.3.4	Actions for the identification, elimination and environmentally sound management of electrical equipment containing PCBs in use.....	103
3.3.5	Actions to eliminate and restrict the production, use, import and export of DDT	105
3.3.6	Actions on specific exemptions	108
3.3.7	Actions to reduce and eliminate releases of unintentionally produced POPs	108
3.3.8	Actions and measures to reduce releases from POPs stockpiles and wastes	120
3.3.9	Strategies to identify POPs stockpiles, articles in use and wastes	122
3.3.10	Actions and measures to properly manage POPs stockpiles and dispose of articles containing POPs in use	124
3.3.11	Strategies for the identification and environmentally sound management of POPs contaminated sites.....	126
3.3.12	Promote information exchange for concerned parties.....	127
3.3.13	Public information, awareness and education	128
3.3.14	Actions for the effectiveness evaluation	130
3.3.15	Reporting	130
3.3.16	Monitoring, research and development.....	131
3.3.17	Technical and financial assistance	137
3.4	Proposals on and priorities for long-term capacity building for Convention implementation	139
3.5	Timetable for the implementation of action plans	141
3.6	Financial requirements and arrangements.....	172
	References.....	198

Tables

Table 2-1	Basic climate parameters.....	17
Table 2-2	Population density and basic economic parameters of six	18
Table 2-3	Setup of local governments of China	20

Table 2-4	Gross product value of agriculture, forestry, livestock farming	21
Table 2-5	Sales revenues of industrial sectors related to POPs reduction and	21
Table 2-6	Basic situation of natural resources of China	21
Table 2-7	Departmental Regulations on Management of Hazardous Chemicals and Pesticides	34
Table 2-8	Production situation and uses of pesticide POPs in Annex A at the end of 2004	37
Table 2-9	Basic situation of other pesticide POPs that were never produced	38
Table 2-10	Chlordane use distribution in China from 1997-2001	41
Table 2-11	The policy and regulatory framework related to PCBs	47
Table 2-12	Demonstration data of PCBs concentrations	48
Table 2-13	DDT exports of China from 1998 to 2004	51
Table 2-14	Demonstration data for DDT concentrations in different	52
Table 2-15	DDT concentrations in various foods of China in 2000	53
Table 2-16	Inventory of estimated Dioxin releases in 2004	56
Table 2-17	Key industries to which China gives priority for control	67
Table 2-18	Relevant Technical Requirements in the	69
Table 2-19	Situations of Dioxin release control technologies	72
Table 2-20	Sample data on Dioxin concentrations in research reports of some regions	73
Table 2-21	Known Pesticide POPs Wastes	74
Table 2-22	Some Sources of POPs Wastes Containing	78
Table 3-1	Technical guidance for environment impact assessment	110
Table 3-2	Technical standards or specifications recommended for revision or promulgation	110
Table 3-3	Technical policies recommended for revision or promulgation	111
Table 3-4	National standards on release (control) of pollutants	113
Table 3-5	Standards on methods for dioxin monitoring to be developed or revised	114
Table 3-6	Cleaner production standards or cleaner	116
Table 3-7	Standards for the release/control of pollutants from existing sources in key industries of the country that should be developed or revised	117
Table 3-8	Summary of Actions for the National Implementation Plan	142
Table 3-9	Action plan for the building of institutional capacity and of policies and regulations	144
Table 3-10	Actions for the reduction or elimination of the intentionally produced and used pesticide POPs	146
Table 3-11	Actions for the identification, elimination and environmentally sound management of electrical equipment containing PCBs in use	148
Table 3-12	Actions to eliminate and restrict the production, use, import and export of DDT	150
Table 3-13a	Actions to reduce and eliminate releases of unintentionally produced POPs	152
Table 3-13b	Actions to reduce and eliminate releases of unintentionally produced POPs	154
Table 3-14	Action plan for the identification and disposal of POPs stockpiles, wastes and contaminated sites	156
Table 3-15	Action plan for monitoring	161
Table 3-16	Action plan for research and development	163
Table 3-17	Action plan for promoting information exchange of parties concerned	166
Table 3-18	Action plan for public information	167
Table 3-19	Action plan for effectiveness evaluation, reporting and financial assistance	169
Table 3-20	Phase-out expenses and incremental costs requirements	172

Figures

Fig. 1-1	Development process of the NIP	15
Fig. 2-1	Educational level of population above 6 years old in different regions of China's mainland (2004)	18
Fig. 2-2	Emissions of sulfur dioxide and discharges of COD in China (2000-2005)	23
Fig. 2-3	The amount of industrial solid wastes produced and the amount comprehensively utilized in China (unit: ten thousand tons)	24
Fig. 2-4	Distribution of enterprises producing pesticide POPs in Annex A	38
Fig. 2-5	Outputs of pesticide POPs in Annex A	40
Fig. 2-6	Termite affected areas in China (in shadow)	41
Fig. 2-7	Distribution of identified enterprises producing PCBs oils, PCBs-containing electrical equipment and PCBs-containing paint	45
Fig. 2-8	Distribution of PCBs-containing capacitors in use in the non-power sector in Liaoning Province	46
Fig. 2-9	Distribution of DDT production enterprises	50
Fig. 2-10	Output/production capacity of technical grade DDT in China	50
Fig. 2-11	Distribution of dioxin releases to air by industries in China	65
Fig. 2-12	Distribution of dioxin releases in residues by industries in China	66
Fig. 2-13	Distribution of dioxin releases by industries in China	66
Fig. 2-14	Distribution of six major regions with part of Dioxin-like release sources in China	67
Fig. 2-15	Geographical Distribution of Pesticide POPs Wastes	75
Fig. 2-16	Status and Distribution of PCBs Pollutants Sealed Up in Zhejiang Province	77
Fig. 2-17	Status and Distribution of PCBs Pollutants Sealed Up in Liaoning Province	78

Executive Summary

Government's commitment to Convention implementation

The Chinese government signed the Stockholm Convention on Persistent Organic Pollutants¹ (hereinafter referred to as the Stockholm Convention or the Convention) on May 23, 2001, and the Standing Committee of the Tenth National People's Congress made the resolution to ratify the Stockholm Convention on June 25, 2004. The Convention entered into force for China on November 11, 2004, which also applied to Hong Kong Special Administrative Region and Macao Special Administrative Region. As required in Article 7 of the Stockholm Convention, the Chinese government shall develop and transmit to the Conference of the Parties the National Implementation Plan of China for the Implementation of the Stockholm Convention on Persistent Organic Pollutants (hereinafter referred to as NIP).

The Chinese government solemnly commits to fulfilling the obligations specified by the Convention, comply with the national strategy of sustainable development and, given the support by the Convention's financial mechanism and technology transfer mechanism, incorporate requirements of Convention implementation into the relevant plans of the state. Additionally, it will establish and improve corresponding administrative systems and develop and implement related policies and necessary action measures so as to achieve the control objectives required by the Convention.

China will, by combining actions for Convention implementation with the objectives of "promoting the optimization and upgrading of industrial structure" and "constructing a resource-saving and environment-friendly society," set out in the *Outline of the Eleventh Five-Year Plan for National Economic and Social Development* (hereinafter referred to as the *Outline of National Eleventh Five-Year Plan*), adjust product and industrial structures, promote cleaner production, develop a cyclic economy, boost effective utilization of resources, create new economic growth openings and increase employment opportunities, improve the environment awareness of the whole society and the level of public participation, and ultimately promote sustainable development.

In addition to the aforementioned, China will, based on its actual situation, improve the policies and regulations designed to fulfill objectives of Convention implementation, strengthen institutional capacity building, take relevant strategies and actions, and carry out Convention implementation activities in stages and by region and industry, so as to achieve the following objectives:

- (1) Prohibit and prevent the production and import of aldrin, dieldrin, endrin, heptachlor, hexachlorobenzene, toxaphene and polychlorinated biphenyls (PCBs); begin to eliminate the production, use, import and export of chlordane, mirex and DDT by 2009, except for the production and use of DDT as a closed-system site-limited intermediate and for acceptable purposes; achieve the environmentally sound management of currently used equipment containing PCBs in demonstration provinces and identified high-risk equipment containing PCBs in use by 2015;
- (2) Implement measures for Best Available Techniques and Best Environment Practices (BAT/BEP) for new sources in key sectors with unintentional POPs release by 2008; take prioritized BAT/BEP measures for existing Dioxin² release sources in key sectors of key

¹ persistent organic pollutants, shortened as POPs.

² Polychlorinated dibenzo-p-dioxins and dibenzofurans

regions, and basically control the increasing trend of Dioxin release by 2015.

- (3) Improve support systems for the environmentally sound management and disposal of POPs wastes by 2010; and begin to achieve the environmentally sound management and disposal of identified POPs wastes by 2015.

Main targets and contents of the Convention

POPs possess toxic properties, resist degradation, bioaccumulate and are transported and deposited far from their places of release, where they accumulate in ecosystems for long periods, which are a great threat to human beings' subsistence, propagation and sustainable development.

The Stockholm Convention aims to reduce, eliminate and prevent POPs pollution to protect human health and the environment. The first group of 12 POPs³ to be controlled as prescribed in the Convention Annexes include:

- (1) Annex A (intentionally produced chemicals required to be eliminated by the Convention): aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene and PCBs;
- (2) Annex B (intentionally produced chemicals required to be restricted by the Convention): DDT; and
- (3) Annex C (unintentionally produced chemicals required to be reduced or eliminated by the Convention): polychlorinated dibenzo-p-dioxins and dibenzofurans (hereinafter referred to as Dioxin), hexachlorobenzene and PCBs.

The Convention requires that these actions be taken on the aforementioned 12 POPs.

- (1) Annex A: Except for production, use, import, and export for specific exemptions within specified time periods, gradually eliminate production, use, import and export of such chemicals.
- (2) Annex B: Except for production, use, import and export for specific exemptions within specified time periods, allow production, use, import and export in some fields of application for which there are no substitutes; and gradually eliminate or restrict production, use, import and export of such chemicals.
- (3) Annex C: Within two years of the date of entry into force of the Convention, develop and implement action plans to identify release of the chemicals listed in Annex C and gradually reduce their release by BAT/BEP; phase in the use of BAT for new sources in the categories listed in Part II of Annex C as soon as practicable but no later than four years after the entry into force of the Convention; and for existing release sources listed in Annex C, gradually implement BAT/BEP to reduce their release.
- (4) Stockpiles and wastes containing chemicals listed in Annex A, Annex B or Annex C: Develop appropriate strategies for identifying POPs stockpiles and wastes; manage stockpiles, as appropriate, in a safe, efficient and environmentally sound manner; take appropriate measures so that such wastes, including products and articles upon becoming wastes are handled, collected, transported and stored in an environmentally sound manner; and gradually reduce or eliminate releases from stockpiles and wastes.

Hazards and impacts of POPs in China

Among the first group of 12 POPs listed in the Convention's Annexes, chlordane, mirex and DDT are still in production and use, and Dioxin and POPs from wastes and contaminated sites are still

³ The Convention lists 12 POPs as the first group for control. According to Article 8, the Conference of Parties will add chemicals to be controlled consistent with procedures set out in the Convention.

in existence.

- (1) China is still producing and using chlordane, mirex and DDT. Chlordane and mirex are mainly used for termite prevention and control. In the past, large amounts of DDT used to be applied in agriculture but now it is mainly used as an intermediate in the production of dicofol, as an additive for marine antifouling paint, and for malaria prevention and control. China used to produce toxaphene, PCBs, hexachlorobenzene and a small amount of heptachlor: production of toxaphene, PCBs and heptachlor was stopped in the 1970's and production of hexachlorobenzene was stopped in 2004. In general, the production and use of the POPs listed in Annexes A and B are gradually decreasing in China. In 2004, the amount of direct use of DDT, chlordane and mirex was less than 1,000 tons.
- (2) All 62 subcategories within 10 categories of Dioxin release sources listed in the *Standardized Toolkit for Identification and Quantification of Dioxin Releases* published by the United Nations Environment Program exist in China. According to some actual measurement and estimation, China had about 10 kilograms-TEQ Dioxin release in 2004 and is one of the countries with the large amount of Dioxin releases. Due to very limited measures to control Dioxin releases, the total amount of releases of POPs listed in Annex C under the Convention is on the increase in China. It is anticipated that control of Dioxin releases will be the biggest challenge for China to eliminate or reduce pollution from the first group of POPs.
- (3) Although China banned production of PCBs, toxaphene and heptachlor and the application of DDT in agriculture as early as the 1970's and 1980's, wastes and contaminated sites of the aforementioned POPs were not appropriately managed and disposed of at the time due to constraints of the economy, technology, awareness and management level, and such POPs-containing wastes and contaminated sites still exist.

POPs such as DDT and PCBs still can be detected in the environment and foods. As the substance with the largest output and widest application among intentionally produced POPs, DDT levels have decreased in the environment and foods in China on the whole. New DDT pollution comes from production and use of dicofol and the use of DDT in marine antifouling paint. In a few areas, there is pollution by DDT and PCBs residues in estuary and marine coastal area sediments. Although some research and monitoring data on Dioxin was obtained in the process of development of the NIP, due to constraints in research and monitoring level and analysis costs, China still has a very limited understanding of Dioxin releases and pollution.

At present, China does not have complete regulations and standards on POPs such as Dioxins and PCBs contained in foods, feedstuff and electrical and mechanical equipment, which is not favorable for the protection of human health and of animals and plants. On the one hand, without adequate laws and regulations it is difficult to carry out supervision of domestic products and to prevent foreign products containing Dioxin and PCBs from coming into China. On the other hand, the issue of POPs residues in products has become one of the obstacles to export of Chinese products. Cases concerning international trade obstructed by Dioxin content higher than standards are increasing year by year. As European and American countries stop uses of POPs and reduce their releases, background values of POPs in the environment are gradually decreasing in the developed countries and they will take more rigorous restrictive protection measures for the trading of related commodities, especially foods. As a result, China will face even more severe challenges in foreign trade.

Priorities and action objectives for Convention implementation

Priority areas in the NIP include the following:

- (1) Formulate and improve the policies and regulations required for Convention

- implementation and strengthen institutional building;
- (2) Introduce and develop alternatives/alternative technologies, give an impetus to their industrialization, and introduce and develop BAT/BEP, waste disposal technologies and contaminated site remediation technologies;
 - (3) Eliminate production, use, import and export of chlordane, mirex and DDT;
 - (4) Investigate and update inventories of POPs releases from unintentional production and inventories of electrical equipment containing PCBs and POPs wastes;
 - (5) Implement BAT/BEP to control Dioxin releases in key industries;
 - (6) Establish a financial mechanism so as to ensure the implementation of various action plans;
 - (7) Carry out demonstration projects and replication programs; and
 - (8) Strengthen capacity building and establish a long-term, effective mechanism to control POPs releases.

In order to effectively implement the Stockholm Convention and control POPs releases, the following objectives of China's implementation of the Convention are formulated pursuant to the Convention's different time requirements on POPs control, the present situation regarding POPs pollution in China, and the technological, economic and administrative feasibility of control actions.

Objectives by 2010:

- (1) Elimination of the production, use, import and export of pesticide POPs:
 - (a) Prohibit the production and use of HCB by 2008;
 - (b) Basically eliminate the production and use of chlordane and mirex by 2009;
 - (c) Make an effort to phase out the production and use of DDT by 2009, except for the production and use of DDT as a closed-system site-limited intermediate and for acceptable purposes; and
 - (d) Prohibit the import and export of DDT for any purpose by 2009.
- (2) Control of PCBs use in PCBs-containing equipment in use:
 - (a) Establish a system for the declaration, registration and environmentally sound management of equipment in use containing PCBs by 2010.
- (3) Reduction or elimination of releases of unintentionally produced POPs:
 - (a) Begin to establish a management system for effective implementation of BAT/BEP in key industries unintentionally producing POPs, apply BAT for new sources of key industries, and promote BEP by 2008⁴;
 - (b) Give priority to updating the inventory of sources in key industries unintentionally producing POPs and estimates of their releases, and establish a relatively complete inventory of unintentionally produced POPs by 2010; and
 - (c) Establish a relatively complete management system for the implementation of BAT/BEP for existing sources of unintentionally produced POPs in key industries, and complete relevant demonstration activities by 2010.
- (4) Reduction or elimination of releases of POPs from stockpiles and wastes:
 - (a) Establish a preliminary system for the environmentally sound management of POPs stockpiles and wastes by 2010;
 - (b) Complete the environmentally sound management and disposal of 30% of pesticide

⁴ The concrete time limit will be adjusted according to the time that the Conference of Parties adopts the BAT/BEP Guidelines.

- POPs wastes identified nationwide by 2010; and
- (c) Complete the environmentally sound management and disposal of PCBs wastes in demonstration areas by 2010.
- (5) Other measures and objectives:
- (a) Timely incorporate the processes, technologies, equipment and products related to POPs releases into the *Guiding Catalogue for Industry Restructuring*; and implement encouragement, restriction and phase-out pursuant to time requirements under the Convention;
 - (b) Strengthen the environmental monitoring of POPs releases, evaluate impacts of POPs on the environment and human health, and develop or update relevant environmental and hygienic standards;
 - (c) Study and develop the alternatives/alternative technologies, BAT/BEP, waste disposal and contaminated site remediation technologies required for China's Convention implementation, and strengthen the building of relevant infrastructure;
 - (d) Establish a financing mechanism in which multilateral/bilateral funds, central and local finance, and corporate and private funds are combined to ensure demands for funding to reduce and control POPs releases are met;
 - (e) Enhance infrastructure and capacity building for the research, development, monitoring, evaluation and management relating to POPs; and
 - (f) Raise public awareness and establish and improve mechanisms for public participation in POPs management.

Objectives by 2015:

- (1) Elimination of the use of PCBs in currently used equipment containing PCBs:
 - (a) Achieve the environmentally sound management and disposal of currently used equipment containing PCBs, with identified high risk, across the country by 2015.
- (2) Reduction or elimination of releases of unintentionally produced POPs:
 - (a) Carry out BAT/BEP in key industries with unintentionally produced POPs, and begin to control the upward trend of Dioxin releases by 2015.
- (3) Reduction or elimination of releases originating from POPs stockpiles and wastes:
 - (a) Begin to achieve the environmentally sound management and disposal of pesticide POPs wastes across the country by 2015;
 - (b) Achieve the environmentally sound management and disposal of high-risk PCBs-containing wastes indicated in the inventory for the first phase; and
 - (c) Fulfill the environmentally sound management and disposal of identified Dioxin wastes released by key industries.
- (4) Management of POPs contaminated sites:
 - (a) Establish an inventory of pesticide POPs contaminated sites and begin to form an inventory of sites contaminated by PCBs and Dioxin by 2015; and
 - (b) Establish environmentally sound management and remediation support systems involving the management, eventual land use, environmental remediation, etc., of POPs contaminated sites by 2015.

Long-term objectives:

- (1) Eliminate, gradually, the production and use of DDT as a closed-system site-limited

intermediate and for acceptable purposes.

- (2) Complete the identification of currently used equipment containing PCBs and eliminate uses of PCBs by 2025.
- (3) Promote BAT and BEP in all relevant areas for maximum reduction of Dioxin releases.
- (4) Improve the inventories of POPs wastes and contaminated sites, and gradually eliminate their contamination.

Action and financial needs for NIP implementation

Based on current available technical and economic data, it is initially estimated that about 33.9 billion yuan is required for implementation of the plan. Expenses for each item are as follows:

Action and financial needs for NIP implementation (Unit: thousand yuan)

No.	Content	Total Cost	Incremental Cost ⁵	Baseline ⁶ Cost
Strengthening of institutional capacity and policy and regulatory building		375,550	112,665	262,885
I	Institutions and capacity building			
Action 1	Capacity building of the National Coordination Group for Implementation of the Stockholm Convention (NCG)			
Action 2	Capacity building of departments involved in Convention implementation			
Action 3	Capacity building of the NCG Office			
Action 4	Capacity building of local departments involved in Convention implementation			
Action 5	Capacity building of sectors related with Convention implementation			
II	Develop and improve laws and regulations on POPs management			
Action 1	Develop a plan for the development/revision of relevant laws and regulations			
Action 2	Develop the <i>Regulatory Measures (or Guidance policies) on the Reduction and Control of Persistent Organic Pollutants (POPs)</i>			
III	Build the standards' system for POPs management			
Action 1	Revise related environmental quality standards			
Action 2	Revise or develop related product quality standards, hygienic standards and other standards			
Action 3	Revise or develop emission standards on pollutants in key industries			
Action 4	Develop cleaner production standards, technology policies or technical specifications on relevant industries			
IV	Revise and improve the existing lists relating to POPs management			
Action 1	Revise the <i>List of Hazardous Chemicals</i> and <i>List of Dangerous Goods</i>			
Action 2	Revise the <i>Guiding Catalog of Industrial Structure Regulation</i>			
V	Strengthen enforcement and encourage public participation			
Action 1	Strengthen enforcement			
Action 2	Promote public participation			
VI	Carry out evaluation and research of the Convention implementation mechanisms and policies			

⁵ Incremental cost: the difference between the expenditure on the activity to implement international environmental conventions and the cost of the activity it replaces or makes redundant. It is the measurement of the economic burden a country will shoulder for carrying out activities beyond its national benefits.

⁶ Baseline: cost of the original activity estimated for calculation of the incremental cost.

No.	Content	Total Cost	Incremental Cost ⁵	Baseline ⁶ Cost
Action 1	Carry out the study of POPs impacts and the evaluation and study of candidate and newly listed POPs			
Action 2	Promote the study of policies pertaining to alternatives, alternative technologies and pollution control technologies			
Action 3	Carry out the study of financial mechanisms and economic policies			
Action 4	Regional demonstration			
Action 5	Carry out the effectiveness evaluation of NIP implementation and the study of countermeasures of POPs impacts			
Measures to reduce or eliminate releases from intentional production or use				
Actions to reduce or eliminate intentionally produced and used pesticide POPs (Chemicals listed in Part 1 of Annex A under the Convention)		463,798	194,795	269,002
Action 1	Rigidly restrict and gradually eliminate the production and use of chlordane and mirex			
Action 2	Prohibit the production and use of HCB			
Action 3	Restrict the import and export of the chemicals listed in Part I of Annex A under the Convention			
Action 4	Control pollution caused by chlordane and mirex for specific exemptions in their production, distribution and use			
Actions to identify, eliminate and manage, in an environmentally sound way, PCBs-containing electric equipment in use		103,140	30,942	72,198
Action 1	Improve the environmentally sound management system for PCBs-containing equipment in use			
Action 2	Strengthen the capacity of related institutions in charge of equipment containing PCBs			
Action 3	Identify and label equipment containing PCBs in use, and gradually improve their inventories			
Action 4	Conduct the removal of PCBs in PCB-containing electrical equipment in use or the environmentally sound management of the equipment			
Actions to eliminate and restrict production, use, import and export of DDT		616,173	258,792	357,380
Action 1	Strictly restrict and phase out the production and use of DDT (except for production and use of DDT as a closed-system site-limited intermediate and for acceptable purposes)			
Action 2	Impose strict control on import and export of DDT			
Action 3	Control pollution by DDT for specific exemptions and for acceptable purposes in its production, distribution and use			
Actions on specific exemptions		2,700	810	1,890
Actions to reduce and eliminate Dioxin releases		28,312,210	11,820,387	16,491,823
I	Measures and actions to control new sources of release of unintentionally produced POPs			
Action 1	Evaluate the technical feasibility of applying BAT to new sources in key industries and begin to apply BAT by 2008			
Action 2	Improve the environmental impact assessment system for new sources in key industries by 2008			
Action 3	Revise the <i>Guiding Catalogue of Industrial Structure Regulation</i> by 2008			
Action 4	Establish and improve emission standards for new sources in key industries by 2010			
II	Establish dynamic inventories of Dioxin release in key industries			
Action 1	Establish and strengthen the national capacity for Dioxin monitoring			
Action 2	Establish inventories of Dioxin release sources countrywide			
Action 3	Accomplish the systematic monitoring of Dioxin releases in key industries by 2015			
Action 4	Establish a dynamic monitoring and data reporting mechanism on release sources in key industries by 2015			
III	Actions to reduce and control existing release sources			
Action 1	Give priority to carrying out BAT/BEP application demonstration activities at the enterprise level in present key			

No.	Content	Total Cost	Incremental Cost ⁵	Baseline ⁶ Cost
	industries			
Action 2	Improve the cleaner production standards or cleaner production audit guidelines for key industries, and promulgate BAT/BEP guidance for key industries by 2010			
Action 3	Begin to establish and improve standards on Dioxin emission for existing sources in key industries by 2010			
Action 4	Accomplish the first stage of BAT/BEP promotion in existing key industries by 2015			
Action 5	Further revise cleaner production standards and cleaner production audit guidelines on the existing sources in key industries, as well as BAT/BEP guidance for the key industries of China by 2015			
Action 6	Further revise the previously established emission standards on existing sources in key industries by 2015			
Action 7	Accomplish the second stage of BAT/BEP promotion for existing sources in the key industries by 2025 (for which costs are not included)			
IV	Actions and measures to sustainable reduction and control of Dioxin releases			
Action 1	Establish a mechanism for the periodic evaluation and updating of unintentionally produced Dioxin release reduction and control strategies and of implementation effectiveness			
Action 2	Gradually establish and improve a policy guiding mechanism for the release reduction and control of Dioxin			
Actions and measures to reduce releases from POPs stockpiles and wastes		2,154,228	904,701	1,249,527
Action 1	Improve the system for the environmentally sound management of POPs wastes			
Action 2	Strengthen the institutional capacity for the environmentally sound management of POPs stockpiles and wastes			
Action 3	Improve the capacity for the environmentally sound disposal of POPs wastes			
Action 4	Implement, and adjust on a timely basis, the plans for the environmentally sound disposal of POPs wastes			
Strategies to identify POPs stockpiles, articles in use and wastes		139,500	58,590	80,910
Action 1	Improve the dynamic database system for POPs stockpiles and wastes			
Action 2	Identify pesticide POPs stockpiles and wastes			
Action 3	Identify wastes containing PCBs			
Action 4	Identify wastes containing Dioxin			
Actions and measures to properly manage POPs in stockpiles and to dispose of POPs-containing articles in use		69,750	29,295	40,455
Action 1	Appropriately manage POPs stockpiles			
Action 2	Identify and effectively manage products or articles in use containing pesticide POPs			
Action 3	Appropriately manage and dispose of PCBs-containing electrical equipment in stock			
Strategies for the identification and environmentally sound management of POPs-contaminated sites		1,800	756	1,044
Action 1	Establish an environmentally sound management system for POPs-contaminated sites and soils			
Action 2	Develop and implement strategies for the identification of POPs-contaminated sites			
Action 3	Develop strategies for the environmentally sound remediation of POPs-contaminated sites			
Promotion of information exchange for concerned parties		11,700	3,510	8,190
Public information, awareness and education		30,400	9,120	21,280
Effectiveness evaluation actions		2,000	600	1,400
Reporting		2,700	810	1,890
Monitoring, research and development		1,617,404	485,221	1,132,182
I	POPs monitoring actions			
Action 1	Establish and improve a POPs monitoring system			

No.	Content	Total Cost	Incremental Cost ⁵	Baseline ⁶ Cost
Action 2	Monitor release sources of POPs			
Action 3	Monitor presence and levels of POPs in environmental media and organisms			
Action 4	Monitor POPs contaminated sites			
Action 5	Monitor POPs contents in food and drinking water			
Action 6	Monitor residual body concentrations of POPs in key groups and ordinary residents exposed to POPs			
II	Research and development			
Action 1	Carry out the study of POPs transport and transformation behavior			
Action 2	Carry out the study of physical exposure to POPs and risk evaluation of POPs impacts on ecological environment and human health			
Action 3	Carry out development of POPs monitoring methods			
Action 4	Conduct analysis and study of technical and economic costs for BAT/BEP activities			
Action 5	Carry out development of POPs alternatives/alternative technologies			
Action 6	Carry out development of the disposal technologies of POPs wastes and emission control technologies			
Technical and financial assistance		10,050	3,015	7,035
I	Technical assistance and technology transfer			
II	Financial assistance			
Total		33,915,105	13,914,011	20,001,094

Referring to the document of the Global Environment Facility (GEF/C.7/Inf.5) concerning its guidance on incremental cost, the initially identified expenses and full incremental costs for POPs reduction and control in the short and medium term include:

- (1) expenses and incremental costs of eliminating production of POPs as pesticides (including profit loss, compensation for unemployment, expenses of equipment dismantlement and production sites pollution treatment);
- (2) expenses and incremental costs of the use of POPs alternatives as pesticides (including expenses of alternatives introduction, substitution of equipment and its operation, and publicity and training);
- (3) expenses and all incremental costs of eliminating online use of PCBs equipment (including expenses of checking, labelling, dismantling, replacing, transport and disposing);
- (4) expenses and incremental costs of controlling release from unintentionally produced POPs by BAT/BET (including expenses of release monitoring, technology design, and technology innovation and operation);
- (5) expenses and incremental costs of investigation and disposal of wastes and contaminated sites (including expenses of investigating, marking, cleanup and disposing); and
- (6) expenses and incremental costs of management capacity building (personnel, information collection and dissemination, and policy formulation), monitoring capacity building, substitution technology capacity building, data (production, use, wastes) collection and reporting, wastes and contaminated sites disposal capacity building.

As the Conference of the Parties of the Stockholm Convention lists more POPs for control, and the NIP is updated and complemented in the future, the aforementioned expenses and full incremental costs of POPs control will correspondingly be updated and complemented.

Chapter 1 Introduction

1.1 Background

Persistent organic pollutants (POPs) possess toxic properties, resist degradation, bioaccumulate, and are transported, through air, water and migratory species, across international boundaries and deposited far from their place of release, where they accumulate in terrestrial and aquatic ecosystems. Even very low exposure to POPs may induce cancer, damage central and peripheral nervous system, cause immunity system diseases and procreation disruption, and disturb the normal growth of infants. Therefore, POPs pose great threats to the subsistence, reproduction and sustainable development of human beings.

The Stockholm Convention on Persistent Organic Pollutants (hereafter referred to as the Stockholm Convention or the Convention) aims to reduce, eliminate and prevent POPs pollution to protect human health and the environment. The Stockholm Convention includes 30 articles and 6 annexes.

The first group of 12 POPs² to be controlled as specified in the Convention's Annexes include:

- (1) Annex A (intentionally produced chemicals): aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene and PCBs;
- (2) Annex B (intentionally produced chemicals): DDT; and
- (3) Annex C (unintentionally produced chemicals): polychlorinated dibenzo-p-dioxins and dibenzofurans (collectively referred to as Dioxin), hexachlorobenzene and PCBs.

The Convention requires that actions be taken on the aforementioned 12 POPs:

- (1) Annex A: except for production, use, import and export for specific exemption uses within specified time periods, gradually eliminate production, use, import and export of such chemicals.
- (2) Annex B: except for production, use, import and export for specific exemption uses within specified time periods, allow production, use, import and export in some fields of application for which there are no substitutes; and gradually eliminate or restrict production, use, import and export of such chemicals.
- (3) Annex C: within two years of the date of entry into force of the Convention, develop and implement action plans to identify release of chemicals listed in Annex C and gradually reduce their release by BAT/BEP; phase in use of BAT for new sources in the categories listed in Part II of Annex C as soon as practicable but no later than four years after the entry into force of the Convention; and for existing release sources listed in Annex C, gradually implement BAT/BEP to reduce their releases.
- (4) Stockpiles and wastes of Annex A, Annex B and Annex C: develop appropriate strategies for identifying POPs stockpiles and wastes; manage stockpiles, as appropriate, in a safe, efficient and environmentally sound manner; take appropriate measures so that such wastes, including products and articles upon becoming wastes are handled, collected, transported and stored in an environmentally sound manner; and gradually reduce or eliminate releases from stockpiles and wastes.

²The Convention lists 12 POPs as the first group for control. According to Article 8, the Conference of Parties will add chemicals to be controlled consistent with procedures set out in the Convention.

China had been participating in negotiations related to the Stockholm Convention since 1998 and signed the Convention on May 23, 2001. On June 25, 2004, the 10th Session of the Standing Committee of the Tenth National People's Congress made the resolution to ratify the Stockholm Convention. The Convention entered into force for China on November 11, 2004⁸, which also applied to the Hong Kong Special Administrative Region and the Macau Special Administrative Region.

In order to effectively implement the Stockholm Convention, the State Council of China approved establishment of the National Coordination Group for Implementation of the Stockholm Convention (NCG) on May 2005, consisting of 11 ministries and agencies: the State Environmental Protection Administration (SEPA) as the leading agency, the Ministry of Foreign Affairs, the National Development and Reform Commission (NDRC), the Ministry of Science and Technology (MoST), the Ministry of Finance, the Ministry of Construction, the Ministry of Commerce, the Ministry of Agriculture, the Ministry of Health, the General Administration of Customs, and the State Electricity Regulatory Commission. SEPA, as the national focal point of the Convention, is responsible for communication between China and the Secretariat of the Convention and other Parties.

China has sent delegates to join in the BAT/BEP Expert Group² and the POPs Review Committee.

In order to identify POPs production, use and release sources, formulate corresponding sector strategies and plans, raise the public's awareness and conduct reduction and control activities, the Chinese government has carried out a number of activities with financial and technical support from Italy, Canada, the United States, Japan and the Global Environment Facility (GEF). These activities include: serial regional publicity and training, POPs exposure impact assessment, development of pesticide POPs¹⁰ elimination action plan, development of PCBs reduction and disposal action plan, development of Dioxins reduction and control action plan, Dioxins laboratory capacity building. Meantime, China is preparing or implementing key sector Dioxins reduction technology demonstration, demonstration of PCBs management and disposal, demonstration of alternatives to chlordane and mirex in termite control, DDT substitution in ship antifouling paint production, demonstration of substitution of dicofol using DDT as the intermediate, sustainable environmental management of medical wastes, and non-incineration technology demonstration for POPs wastes and contaminated sites. These activities have not only provided a great amount of data and technical support for development of the NIP, but also laid a favorable foundation for convention implementation by China in the future.

Reduction, elimination and prevention of POPs pollution is a long process. China needs to take corresponding control and reduction measures, including: closure and changing production of enterprises that are intentionally producing POPs; eliminating obsolete techniques and products, promoting alternatives and alternative technologies, and low emission technologies. For sectors such as electricity power, steel, nonferrous metal, cement and chemical industry and fields such as wastes and hazardous goods disposal, it is necessary to carry out technology renovation and product structural adjustment to reduce Dioxins release. These are fully consistent with related industrial development policies and adjustment policies of China on sectors with surplus outputs.

⁸ Paragraph 2 of Article 26 of the Convention: for each State or regional economic integration organization that ratifies, approves or accepts this Convention or accedes thereto after the deposit of the fiftieth instrument of ratification, acceptance, approval or accession, the Convention shall enter into force on the ninetieth day after the date of deposit by such State or regional economic integration organization of its instrument of ratification, acceptance, approval or accession.

² Best Available Techniques (BAT)/Best Environmental Practices (BEP)

¹⁰ Aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene and DDT.

The current social and economic development and environmental protection situation of China has provided opportunities to solve the POPs issues. Firstly, the government has confirmed its determination to realize three transformations: a) to transfer from emphasizing economic growth while ignoring environmental protection to stressing both environmental protection and economic growth, making strengthening of environmental protection an important instrument for adjustment of economic structure and change of economic growth model to seek development in the course of environmental protection; b) to transfer from environmental protection lagging behind economic development to environmental protection progressing simultaneously with economic growth, try to pay back the old debts without owing new debts and change the situation that treatment goes after pollution and destruction comes together with treatment; c) to transfer from depending mainly on administrative measures for environment protection to comprehensively taking legal, economic, technical and necessary administrative measures to solve environmental problems, consciously follow the economic and natural principles and improve the working level in environmental protection. Secondly, the institutional and regulatory strengthening, and science and technology development in China have created conditions to solve the POPs issue. Thirdly, China is promoting cleaner production, advocating a circular economy and promoting building of a resources saving and environmental friendly society, which have provided a strong guarantee for reduction or elimination of POPs.

The Stockholm Convention puts forward the requirement to reduce, eliminate and prevent POPs pollution, and will provide technical and financial assistance for developing countries at the same time. Therefore, implementing the international convention will help improve the level of environmental protection in China and promote institutional strengthening of environmental management, cleaner production, adjustment of industrial and product structure and promote sustainable development.

Taking into consideration the requirements of the convention and environmental protection of China, the Chinese government organized development of the NIP, based on the national situation and features of POPs issues, in order to prevent and eliminate impacts of POPs pollution on the social and economic development and the public's living and production, as well as its harm to the global environment and human health.

1.2 Purpose and contents

The purpose of developing the NIP is to: identify the critical issues which meet the requirements of the Convention and of environmental protection of China and are related to POPs reduction, elimination and prevention; put forward the strategies and action plans for implementing the Stockholm Convention to provide guidance for convention implementation; and protect the ecological environment and human health of China and the whole world.

The NIP is divided into three chapters. Chapter 1 introduces the process of China's participation in the Convention, main provisions of the Convention, a summary of POPs-related issues, objectives and development principles of the NIP, development mechanism, the consultation process with stakeholders, clarification of uncertainties in the NIP and its update and amendment. Chapter 2 elaborates on the basic national situation related to Convention implementation, including the current situation of POPs and POPs-related research and management, as well as the institutional, and policy and other capacity building requirements for solving the problems. Chapter 3 defines the strategic objectives for China to implement the Convention and the specific action plans addressing Convention requirements, as well as capacity building and financial needs to implement the plan.

Documents and reports supporting for development of the NIP include: *the Action Plan of China for Reduction and Elimination of Pesticide POPs*, *the Action Plan of China for PCBs Management and Disposal*, *the Action Plan of China for Reduction and Control of Unintentionally Produced POPs*, *the Strategy of China for Inventory Investigation and Disposal of POPs Wastes and Contaminated sites*, *the Strategy and Action Plan of China for POPs Related Policies, and Laws and Regulations* and *the Preliminary Assessment of Social and Economic Impacts for China to Implement the Stockholm Convention*.

1.3 Development principles and process

1.3.1 Development principles

The basic principles for developing the NIP are as follows: the tenet is to implement the scientific development concept and promote sustainable development with human beings as the base; the starting point is protecting the health of humans and their living environment; the main route is to control POPs releases; the priority is to reduce, eliminate and control intentionally produced POPs, key release sources of Dioxin and high-risk wastes containing POPs; and the guarantee is to be realized by formulating and improving policies, laws and regulations necessary for convention implementation, strengthening law enforcement and supervision, improving environmental management capacity and establishing a proper financial mechanism.

On the basis of China's real situation, a POPs elimination mechanism in which the government will take the lead, enterprises will serve as main body and the public and different sectors will extensively participate is established, and strategies and action plans which are technically feasible and economically efficient are put forward, so as to guarantee China's implementation of the Stockholm Convention, to promote international cooperation and to promote solving of the POPs issue.

Development of the NIP is based on the laws of China, including *Law on Environmental Protection**Environmental Protection Law of the People's Republic of China*, *Law on Solid Wastes Pollution Prevention and Control**Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Wastes*, *Law on Air Pollution Prevention and Control**Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution*, *Law on Water Pollution Prevention and Control**Law of the People's Republic of China on the Prevention and Control of Water Pollution*, *Law on Marine Environmental Protection**Marine Environment Protection Law of the People's Republic of China*, *Law on Environmental Impact Assessment**Law of the People's Republic of China on Evaluation of Environmental Effects*, *Law on Clean Production Promotion**Law of the People's Republic of China on Promotion of Cleaner Production*, *Agriculture Law**Agriculture Law of the People's Republic of China*, *Foreign Trade Law**Foreign Trade Law of the People's Republic of China*, *Food Hygiene Law**Food Hygiene Law of the People's Republic of China*, and *Law on Professional Disease Prevention and Control**Law of the People's Republic of China on the Prevention and Treatment of Occupational Diseases*, etc.

Development of the NIP complies with requirements stated in the *Outline of the 11th Five-Year Plan for National Economy and Social Development* (the *Guideline of the National 11th Five-Year Plan*), the *Decision of the State Council on Implementing the Scientific Development Concept for Strengthening Environmental Protection* (the *Decision of the State Council on Strengthening Environmental Protection*), the *Provisional Regulations on Promoting Industrial Structure Adjustment*, and relevant national plans. It follows the directions of "promoting the optimization

and upgrading of industrial structure”, “constructing a resource-saving and environment-friendly society”, “establishing and improving a long-term effective mechanism for environmental protection,” and placing emphasis on addressing “key problems seriously harming people’s health”.

The NIP put forward the total financial needs for all Convention implementation activities up to 2015 and, pursuant to Article 13 and Article 14 of the Convention and the GEF principle on the incremental costs¹¹, estimates the incremental cost needs for implementing the NIP up to 2015.

1.3.2 Development process

According to Article 7 of the Convention, each Party to the Convention shall transmit its NIP to the Conference of the Parties within two years of the Convention’s entry into force for it. Therefore, the Chinese government set up the Leading Group for Development of the NIP (led by the State Environmental Protection Administration, and composed of 11 ministries and agencies, including the Ministry of Foreign Affairs, National Development and Reform Commission, Ministry of Science and Technology, Ministry of Finance, Ministry of Construction, Ministry of Commerce, Ministry of Agriculture, Ministry of Health, General Administration of Customs and State Electricity Regulatory Commission) in 2003 to provide guidance for development of the NIP.

Related institutions and organizations, at home and abroad, have greatly supported and actively participated in the development of the NIP. With the support of the United Nations Industrial Development Organization and the World Bank, NIP development received GEF grants. The Italian government provided funds for development of the *Action Plan of China for Reduction and Elimination of Pesticide POPs*, the *Action Plan of China for PCBs Management and Disposal*, and the *Action Plan of China for Dioxin Reduction*. The United Nations Development Program (UNDP) and the World Bank, as the international executing agencies, assisted in development of the first two action plans of the above-mentioned plans, which laid a favorable foundation for the NIP development. Directed by the Leading Group for Development of the NIP, SEPA organized: related higher education institutions and scientific research institutes including Peking University, Tsinghua University, Beijing Normal University, Chinese Academy of Sciences, Chinese Academy of Environmental Sciences and the Environmental and Economic Policy Research Center of SEPA; sector associations including China Petroleum and Chemical Industry Association, China Construction Materials Association, China Non-ferrous Metal Association and China Steel Industry Association; and related institutions including the National Termite Prevention and Control Center, the Institute for Control of Agro-chemicals of the Ministry of Agriculture, China Disease Prevention and Control Center and China Electricity Council; and local government agencies to together carry out the NIP development.

In development of the NIP, stakeholders, at home and abroad, were consulted many times. Through interagency coordination meetings, meetings with sector, a series of regional symposia and international technical coordination meetings, opinions were fully listened to from experts from related domestic agencies, local governments, related sectors, enterprises, non-governmental organizations, the public, the United Nations Industrial Development Organization, the United Nations Development Program, the United Nations Environment Program, the United Nations Institute for Training and Research, the Food and Agriculture Organization, the Global Environment Facility, the World Bank, as well as from countries including Italy, Canada, the United States, Japan, Switzerland, Germany and Norway, and revisions were made accordingly.

¹¹ GEF/C.7/Inf.5, Incremental costs, February 29, 1996.

The process of NIP development is shown in Figure 1-1. The final draft of the NIP was submitted to and approved by the State Council after review by the members of the NTC.

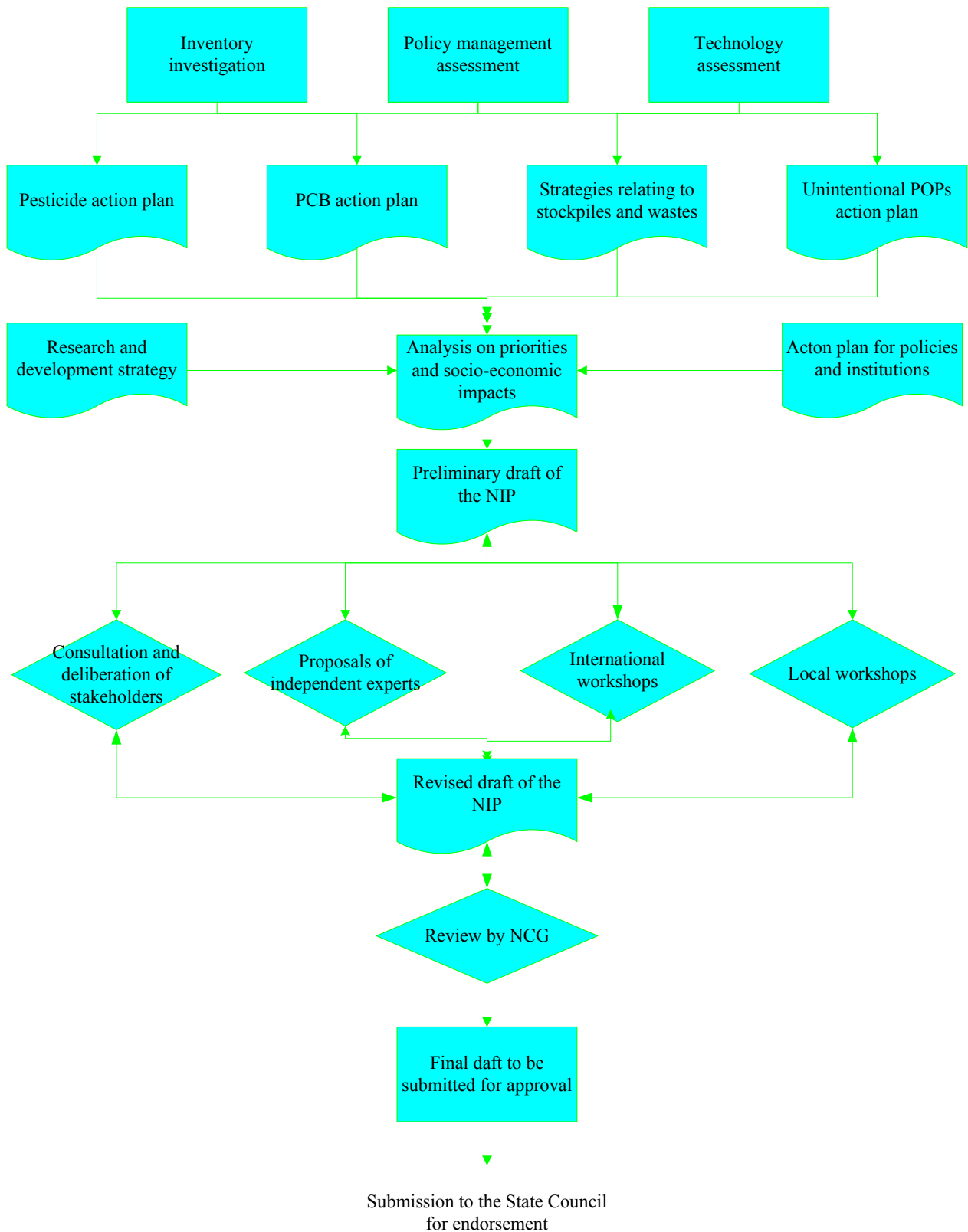


Fig. 1-1 Development process of the NIP

1.4 Updating and amendment of the NIP

According to the Convention requirements, China will update and amend the NIP at the appropriate time. Constrained by the investigation scope and the level of research, monitoring, and substitution and release reduction technologies, the release inventory of Dioxin in the NIP was basically worked out by using the toolkit recommended by UNEP and actual monitoring was only conducted on a few key sources. The cost estimation on application of BAT/BEP was mainly based on demonstration projects carried out in China and foreign cases and didn't contain all the sectors and different technologies. The inventories of PCBs-containing equipment in use, POPs wastes and contaminated sites were mainly made based on the limited available information and estimates. Specific terms under the Convention regarding the financial mechanism and assistance principle and technology transfer mechanism need to be further clarified, and there will be new POPs added to the Convention to be controlled.

The Hong Kong and Macao Special Administrative Regions are not involved in the information and data and action plans of this Part I of the NIP relating to POPs.

Chapter 2 Basic Situation of the Country

2.1 Country profile

2.1.1 Geography and population

China is located in the east of Asia and west of the Pacific. The land area of China is about 9.6 million square kilometers and the sea area is about 4.73 million square kilometers. The border stretches 32,000 kilometers (including 18,000 kilometers of coastline). The basic climate parameters are shown in Table 2-1. In 2004, the total population of China already approached 1.3 billion (excluding that of Hong Kong, Macau and Taiwan), among which the urban population and rural population account for 41.8% and 58.2%, respectively. The natural growth rate of the population is 5.87%. The education situation is shown in Figure 2-1. Table 2-2 shows the areas and population parameters of the six regions of China's mainland.

Table 2-1 Basic climate parameters¹²

Heat Distribution		Accumulated temperature (in centigrade)
North of Heilongjiang province and the Qinghai-Tibet Plateau		2,000-2,500
Northeast Plain		3,000-4,000
North China Plain		4,000-5,000
Yangtze River basin and area to the south		5,800-6,000
Area to the south of Nanling Mountain		7,000-8,000
Precipitation		(mm)
Coastal area of South China		1,600-2,000
Yangtze River basin		1,000-1,500
North China and Northeast China		400-800
Northwest inland		100-200
Tarim, Turpan and Qaidam basins		≤25
Area proportion of the climatic zones (Country = 100)		(%)
Humid area	(Aridity grade <1.0)	32
Semi-humid area	(Aridity grade = 1.0-1.5)	15
Semi-arid area	(Aridity grade = 1.5-2.0)	22
Arid area	(Aridity grade >2.0)	31

¹² Edited by the State Statistic Bureau of the People's Republic of China, China Statistics Yearbook-2005, published by the China Statistics Publishing Company.

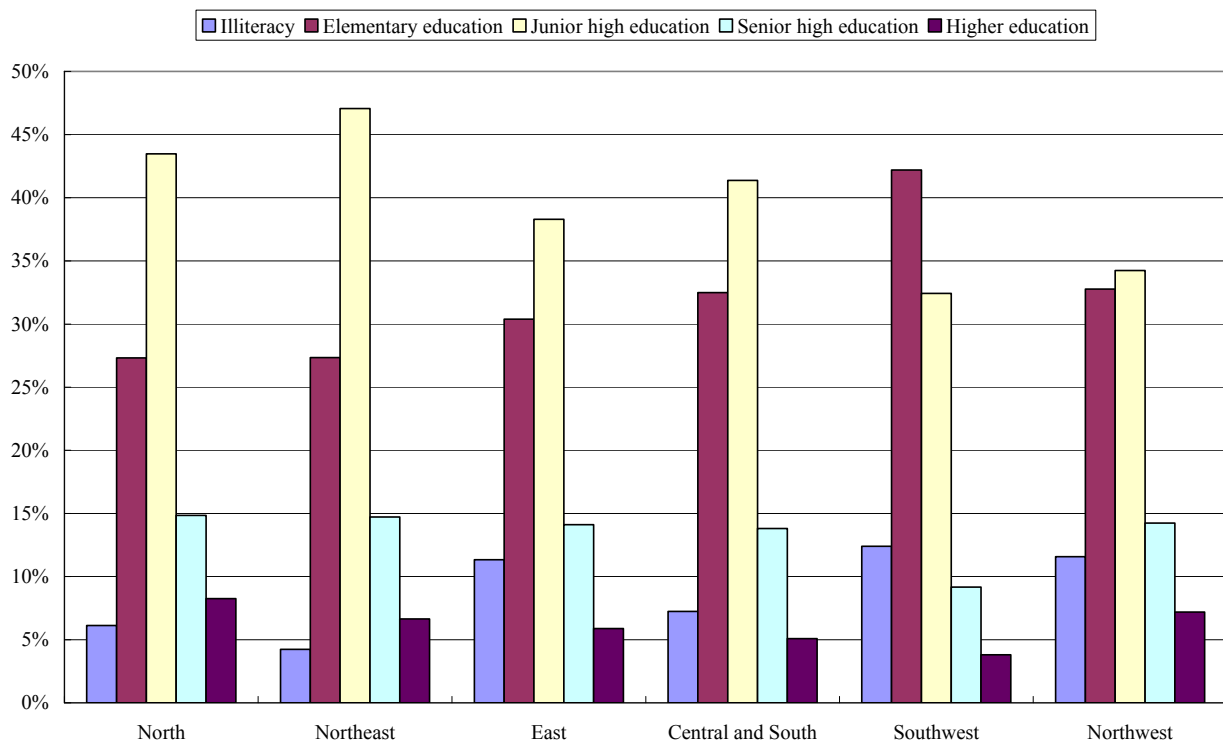


Fig. 2-1 Educational level of population above 6 years old in different regions of China's mainland (2004)

Table 2-2 Population density and basic economic parameters of six regions of China's mainland¹³

Region	Area (%)	Population (%)	Population density (person/ km ²)	Regional GDP (100 million Yuan)	Per capita GDP (Yuan)
North China	16.3	11.6	97	21,739	14,449
Northeast China	8.4	8.3	134	15,134	14,087
East China	8.2	28.8	473	63,949	17,130
Central and South China	10.7	28.2	357	40,867	11,214
Southwest China	24.6	15.8	87	13,984	6,842
Northwest China	31.8	7.3	31	7,569	8,040
Total/average	100	100	135	163,242	12,614

Notes:

North China: Beijing Municipality, Tianjin Municipality, Hebei Province, Shanxi Province, Inner Mongolian Autonomous Region

Northeast China: Liaoning Province, Jilin Province, Heilongjiang Province

East China: Shanghai Municipality, Jiangsu Province, Zhejiang Province, Anhui Province, Fujian Province, Jiangxi Province, Shandong Province

Central and South China: Henan Province, Hubei Province, Hunan Province, Guangdong Province, Guangxi

¹³ China Statistics Yearbook-2005, edited by the State Statistic Bureau of the People's Republic of China, published by China Statistics Publishing Company.

Province, Hainan Province

Southwest China: Chongqing Municipality, Sichuan Province, Guizhou Province, Yunnan Province, Tibet Autonomous Region

Northwest China: Shaanxi Province, Gansu Province, Qinghai Province, Ningxia Hui Autonomous Region, Xinjiang Uygur Autonomous Region

2.1.2 Political and economic profile

I. Political profile

According to the Constitution of the People's Republic of China, the organs for Chinese people to exercise state power are the National People's Congress and local People's Congress at different levels. The state administrative organs, judicial organs and procuratorial organs are all selected by the People's Congress, responsible to it and subject to its supervision.

The National People's Congress is the organ of supreme power of the People's Republic of China, whose standing body is the Standing Committee of the National People's Congress. The National People's Congress and its Standing Committee exercise the legislative power of the state. The People's Congress at local levels are local organs of state power. They guarantee compliance and implementation of the Constitution, laws and administrative regulations within their own administrative regions. According to the authority granted by relevant laws, they pass and issue decisions and examine and decide upon local plans for development of economic, cultural and public undertakings .

The State Council of the People's Republic of China, i.e. the Central People's Government, is the executive body of the organ of supreme power. Based on the Constitution and laws, the State Council formulates administrative regulations, issues decisions and orders, and leads the overall work of all ministries and commissions and local administrative agencies at different levels. Based on laws, as well as on the administrative rules and regulations, decisions and orders of the State Council, the ministries and commissions issue orders, instructions and rules within their own authority.

Local People's Governments at different levels are the executive institutions of local organs of state power and the local government administrative organs. According to the authority granted by relevant laws, the People's Governments at the county level conduct administration on economy, environmental protection, education, science, culture, sanitation, physical training, urban and rural construction, finance, civil affairs, public security, ethical affairs, judicial administration, supervision, family planning and other administrative work within their own administrative regions. They issue decisions and orders, appoint and remove, train, check, reward and punish administrative personnel. The People's Governments at the township level implement the resolutions made by the People's Congress at its level and decisions and orders made by administrative organs at higher levels. They conduct administration within their own administrative regions. Table 2-3 shows the setup of local governments of China.

Table 2-3 Setup of local governments of China¹⁴

Governments at different levels	Number
Province (autonomous region, municipality directly under the State Council)	32 (5 autonomous regions, 4 municipalities directly under the State Council)
Cities with districts (autonomous prefecture)	333
County (cities without districts, districts directly under cities)	2,862
Town	43,258

II. Economic profile

Since 1978, China has maintained a favorable situation in economic development. In 2004, the GDP reached 15,987.8 billion yuan, increasing by 10.1% compared with that of 2003 and the per capita GDP was 12,000 yuan. Of the total GDP, those of the primary, secondary and tertiary industries were 2,095.6 billion yuan, 7,390.4 billion yuan and 6,501.8 billion yuan respectively. Investment in fixed assets of the whole society was 7,047.7 billion yuan; the national financial revenue and expenditure were 2,639.6 billion yuan and 2,848.7 billion yuan, respectively. In 2004, the foreign exchange reserve of China reached 609.9 billion US dollars.

During 2001 to 2004, the average annual growth rate of the GDP was 9.4%; the average growth rates of the national financial revenue and the national financial expenditure were 18.5% and 15.8%, respectively; the average annual growth rate of citizen consumption level (absolute yuan) was 7.6%. The energy production and consumption of China were both on the increase, with the annual growth rates of production and consumption being 10.8% and 12.3%, respectively, and the energy consumption per ten thousand yuan GDP was 1.43 ton of standard coal in 2004. The actual foreign capital utilized by China had been increasing obviously, and the foreign direct investment actually used in 2004 was 60.6 billion US dollars.

Economic development among different regions of China is unbalanced. The costal areas in East China are comparatively developed and the GDP of only five provinces (municipality) in the southeast coastal area (Guangdong, Jiangsu, Shandong, Zhejiang and Shanghai) accounts for 40% of the whole country, while the economy in the middle and western areas is comparatively lagging behind. Meanwhile, there are disparities between the eastern and western areas in terms of technical level, enterprise scale and environmental awareness. The basic economic parameters of the six regions of China are shown in Table 2-2.

2.1.3 Sector economy profile

From 2000 to 2004, sectors related to or affected by POPs reduction and elimination - such as agriculture, power generation and heat supply, steel, non-ferrous metal, mining, chemical industry, textile, leather and medicine - were all on an obvious increase (see Table 2-4 and Table 2-5).

¹⁴Not including the special administrative regions.

Table 2-4 **Gross product value of agriculture, forestry, livestock farming and fishery of China in 2000-2004**

Year	2000	2001	2002	2003	2004
Gross output value (100 Million Yuan)	24,916	26,180	27,391	29,692	36,239

Table 2-5 **Sales revenues of industrial sectors related to POPs reduction and elimination of China in 2000-2004** (Unit: 100 million yuan)

Sector	2000	2001	2002	2003	2004	Average Annual growth rate
Black metal smelting and processing	3,862	4,472	5,072	8,834	13,181	35.9%
Non-ferrous metal smelting and processing	1,310	1,427	1,534	2,344	3,324	26.2%
Textile	2,359	2,462	2,672	4,404	5,075	21.1%
Wood processing	169	185	209	332	330	18.2%
Petroleum processing, coking, nuclear fuel processing	3,922	4,048	4,201	5,793	7,713	18.4%
Chemical raw materials and chemical production	3,278	3,702	4,189	5,514	7,130	21.4%
Medicine production	1,069	1,304	1,529	1,944	2,167	19.3%
Power and heat generation and supply	5,523	6,308	7,393	9,629	12,013	21.4%
Paper-making and paper product manufacturing	643	841	972	1,338	1,568	25.0%
Non-metal mineral production	1,260	1,480	1,609	2,448	3,006	24.3%

2.1.4 Profile of natural resources and the environment

The basic situation of natural resources of China in 2004 is shown in Table 2-6.

Table 2-6 **Basic situation of natural resources of China**

Category	Quantity	Unit
Land resources		
Cropland	13,004	10 thousand hectares
Wasteland	10,800	10 thousand hectares
Suitable for agriculture	3,535	10 thousand hectares
Forestry land	28,493	10 thousand hectares

Wasteland and mountain suitable for forestation	5,471	10 thousand hectares
Grassland	40,000	10 thousand hectares
Usable area	31,333	10 thousand hectares
Forestry area		
Forest area	17,491	10 thousand hectares
Forest coverage	18.21	%
Living stumpage accumulated quantity	1,361,810	10 thousand cubic meters
Forest accumulated quantity	1,245,585	10 thousand cubic meters
Water resources		
Land		
Total water amount	24,129.6	10 thousand cubic meters
Surface water amount (river flow amount)	23,126.4	10 thousand cubic meters
Groundwater amount	7,436.3	10 thousand cubic meters
Overlapped surface water and groundwater amount	6,433.1	10 thousand cubic meters
Ocean		
Theoretical reserved amount of marine energy	6.3	100 million kilowatts
Seashore area	28	10 thousand square meters
Beach area	2.08	10 thousand square meters

Notes: Figures for land resources come from past surveys and need further verification; the figure for cropland area comes from the agricultural investigation in 1996; the figure for grassland comes from the investigation in 1991; the figures for forestry land and forestry resources come from the sixth national forestry resources investigation (1999-2003); and figures for water resources, except total water amount, come from the evaluation in 1985.

Continued and rapid economic growth has caused huge pressures on the environment. The Chinese government has attached great importance to environmental protection and the aggravating trend of environmental pollution and ecological destruction has slowed, although resources consumption and outputs of pollutants are increasing. Because the total pollutant discharge is huge, the discharged amount of main pollutants has exceeded the environmental load-bearing capacity, the eco-environment has been severely damaged and new pollution problems are appearing, posing quite a severe environmental situation. During the “Tenth Five-Year Plan” period, neither of the 10% reduction targets of the two major environmental protection indicators¹⁵ was realized. In 2005, the amount of sulfur dioxide emissions for the whole country increased by 27% compared with that of 2000, and the discharges of COD only decreased by 2%. Emissions of sulfur dioxide and discharges of COD for 2000-2005 in China are shown in Figure 2-2.

¹⁵ Amount of sulfur dioxide emissions and discharges of chemical oxygen demand (COD).

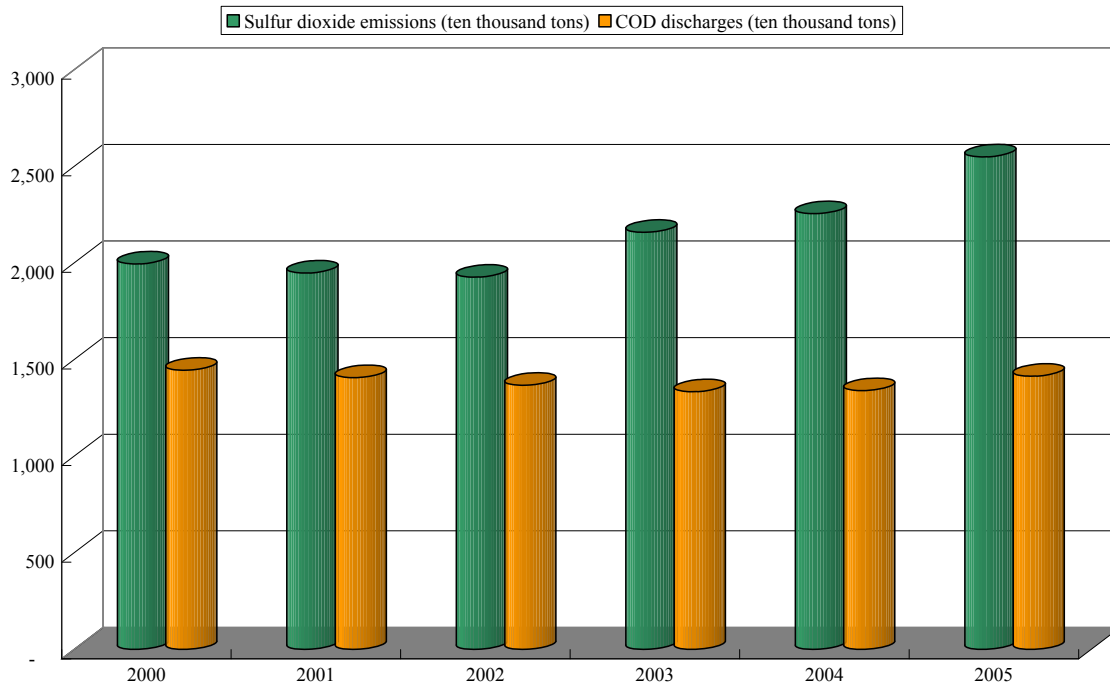


Fig. 2-2 Emissions of sulfur dioxide and discharges of COD in China (2000-2005)

Atmospheric environment: According to the monitoring of 342 cities in 2004, 132 cities, whose population accounted for 33.1% of the total of the cities monitored, reached the national Grade II standard for air quality (residential area). The primary factor that influences urban air quality is inhalable aerosol. The concentration of inhalable aerosol in 46.8% of cities exceeds the national Grade II standard for air quality. In addition, the middle and western areas are commonly facing sulfur dioxide pollution. Areas south of the Yangtze River are facing large scale acidic precipitation problems and in some cities, the concentration of volatile organic substances in the atmosphere is rather high.

Aquatic environment: In 2004, of the seven large river systems, the water quality of the Zhujiang River and the Yangtze River was relatively good, while that of the Liao River, the Huai River, the Yellow River, the Songhua River and the Hai River was relatively bad. Over half of the Hai River has been seriously polluted and has lost basic functions for use. Of the 131 major lakes, most have been polluted to varying degrees and over one-half are eutrophic. Coastal areas, the East Sea and the Bohai Sea, are seriously polluted. In recent years, red tides occurred many times in the Bohai Sea, which had great negative impacts on marine breeding and coastal area economic development.

Solid waste: In 2004, 1.2 billion tons of industrial solid wastes were generated, an increase of 20.0% compared with the previous year; the discharged amount was 17.92 million tons, a decrease of 7.7% compared with the previous year; the amount of solid waste comprehensively utilized was 680 million tons, about the same proportion as the previous year; and the amount of hazardous wastes produced was 9.63 million tons.

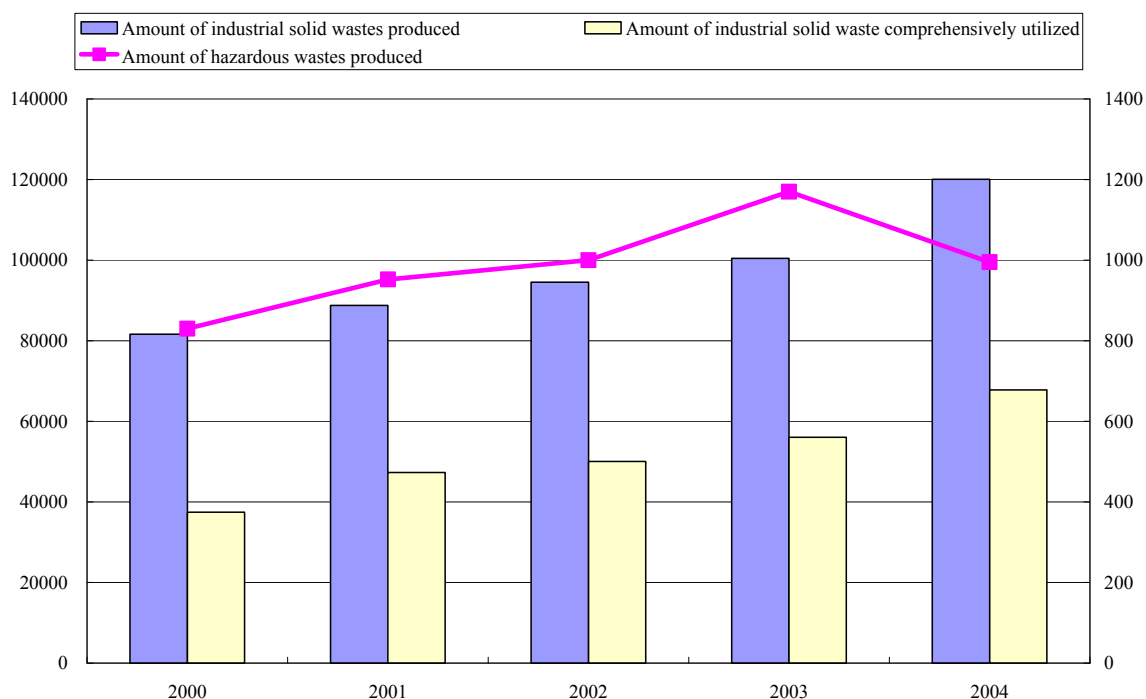


Fig. 2-3 The amount of industrial solid wastes produced and the amount comprehensively utilized in China (unit: ten thousand tons)

The amounts of hazardous wastes produced are shown in the secondary coordinates (left side)

Natural ecology: Issues such as water and soil erosion, desertification, lake shrinkage, wetland decreasing, forestry and grassland degradation and biodiversity destruction are still prominent. In order to conserve and recover the ecology, China has adopted policies and measures such as reforestation, converting cropland back to forestry and grassland, treating desertified land and establishing nature reserves. By 2004, 2,194 nature reserves of different levels and types had been established, among which the terrestrial nature reserves cover an area of 14.8% of the total land area of China.

In summary, China is still facing severe environmental problems. Environmental pollution and ecological destruction have become important factors constraining social and economic development. Therefore, the Chinese government is taking active measures to strengthen environmental protection. It has increased investment in environmental protection and is promoting harmonious economic, social and environmental development through promoting clean production, developing a circular economy, and constructing a resources saving and environmentally friendly society.

2.2 Institutional, policy and regulatory framework

2.2.1 Environmental policies, sustainable development policies and general regulatory framework

I. Environmental policies

Environmental protection is a basic national policy of China and a basic function of

governments at various levels.

Since the 1980s, according to the environmental protection laws and related laws, administrative departments in charge of environmental protection under governments at different levels have conducted unified supervision and management of environmental pollution prevention and control within their own administrative regions, and other related departments have conducted supervision and management of pollution prevention and control within their mandates. Governments at different levels are responsible for the environmental quality within their administrative regions.

Environmental policies of China include the following aspects.

- (1) Prevention first and combining prevention and control. For new, rebuilding and expanding projects and regional development projects, systems such as environmental impact assessment, “three simultaneities” and cleaner production should be carried out to reduce pollutant generation and emission. Existing sources of pollutant emissions are required to declare, register and apply for pollutant emission licenses, and emit pollutants and pay emission fees according to the requirements of the licenses. For enterprises and organizations with severe pollution, governments above county level where the enterprises and organizations are located should take legal measures to make them treat pollution within a set time limit.
- (2) Clarifying responsibilities. Local governments are responsible for environmental quality within their administrative regions. Through establishment and improvement of the environmental objective responsibility system for local governments at various levels, environmental objectives are integrated into the economic and social development evaluation and official performance examination. Main tasks and indicators for environmental protection are subject to management by annual objectives, and regular examination and the examination results are publicized.
- (3) The principle of “the one who pollutes shall treat”. Pollutant emission sources take the responsibility to treat pollution and recover the ecology. For instance, for those that refuse to or improperly treat hazardous wastes, the environmental agency of the government above the country level can appoint others to conduct proper treatment and the cost is borne by the responsible units or individuals according to the *Law on the Prevention and Control of Environmental Pollution by Solid Wastes*.
- (4) Strengthening environmental supervision and management. Through establishment and perfection of the environmental supervision and management system, the public is encouraged to participate in environmental oversight and management. National and local environmental situation communiqués and information are released regularly, ambient air quality and water quality of key river basins are publicized, and “environmental hotlines” and written and personal complaint systems are set up. According to the *Provisional Measure on Public Participation in the Environmental Impact Assessment*, for specific programs involving the public’s environmental rights and interests and construction projects that may cause grave impacts, it is required to solicit the stakeholders’ opinions in ways such as public hearings in the environmental impact assessment process.

II. Sustainable development policies

After the United Nations Conference on Environment and Development in 1992, the Chinese government formulated the sustainable development strategy *China 21st Century Agenda* to promote sustainable development through industrial policies. These policy measures include the following aspects.

- (1) Adjusting the industrial structure to constrain or prohibit production and use of equipment and techniques with high consumption, high pollution and inconsistent with industrial policies. The *State Council's Decision on Several Issues Concerning Environmental Protection* issued in 1996 clearly orders closure of 15 types of small enterprises; the *Guiding Catalogue of Industrial Structure Regulation (2005)* issued by the National Development and Reform Commission at the end of 2005 classes over 1,000 industries into the categories of encouragement, restriction and elimination, among which POPs products and related techniques are listed in the restriction or elimination categories.
- (2) Formulating and implementing policies on saving resources, and improving utilization rates of resources and energies. Laws and regulations are promulgated in the fields of water, electricity, coal, minerals, lands, forests, grasslands, oceans and climate to require comprehensive utilization of resources and reduction of resource waste and to encourage enterprises and the society to recycle and reuse waste and obsolete materials. Relevant agencies are drafting technical standards and regulations such as: equipment energy performance standards; water usage ration standards for water usage sectors; energy-saving design regulation for energy consumption sectors; and labeling of reused substances. The *National 11th-Five-year Plan* integrates the energy consumption indicator into the macro regulation objective system for the first time, and requires reduction of energy consumption of unit GDP by 20% in the 11th-Five-year period (2006-2010).
- (3) Promoting clean production and a circular economy, and accelerating transformation of the economic growth mode. The *Clean Production Promotion Law* was officially promulgated and implemented in July 2003. In July 2005, the State Council released the *Guiding Opinions on Accelerating Development of the Circular Economy*, asking NDRC and SEPA to conduct supervision, guidance and examination on circular economy work of the whole country. It lists metallurgy, non-ferrous metal, electrical power, coal, petroleum chemistry, chemical industry, construction materials, light industry, textile and agriculture as the key sectors of circular economy development, and puts forward the objectives for circular economy development.
- (4) Encouraging public participation, promoting sustainable consumption and accelerating transformation of the consumption mode. Encourage people to buy commodities consistent with environmental protection standards through promoting sustainable consumption; form a big sustainable consumption trend in the market by making use of the consumers' environmental protection awareness; and induce enterprises to produce products consistent with environmental standards so as to realize the objective of environmental protection and harmonious development of humans and the environment. Currently, China is promoting environmental labeling, environmental management system certification and energy-saving labeling systems.

Rapid economic growth and the extensive growth mode have brought about huge challenges and pressures on China's environment and resources. The *National 11th-Five-Year Plan* and the State Council's *Decision on Strengthening Environmental Protection* have put forward objectives such as "promoting the optimization and upgrading of industrial structure", "promoting harmonious regional development" and "constructing a resource-saving and environment-friendly society".

III. Overall legal framework

The Constitution of China clearly states that "the nation protects and improves the living environment and the ecological environment, prevents and controls pollution and other public

hazards.” China has formulated 9 environmental protection laws such as *Environmental Protection Law*, *Law on Water Pollution Prevention and Control*, *Law on Marine Environmental Protection*, *Law on Air Pollution Prevention and Control*, *Environmental Impact Assessment Law*, *Clean Production Promotion Law* and *Law on Prevention and Control of Radioactive Pollution*, 15 nature conservation laws, and more than 50 administrative regulations such as *Provisional Regulation on Promoting Industrial Structure Adjustment*, *Regulation on Construction Projects Management for Environmental Protection*, *Detailed Rules on Implementation of the Water Pollution Prevention and Control Law*, *Regulation on Safety Management of Hazardous Chemicals*, *Regulation on Management of Pollutant Emission Fee Collection and Use*, *Measure on Management of Hazardous Wastes Business Permission*, *Regulation on Protection of wild Plants* and *Regulation on Safety Management of Agricultural Transgenic Organisms*. It has also issued regulatory documents such as: *the State Council’s Decision on Implementing the Scientific Development Concept and Strengthening Environmental Protection*, *the State Council’s Opinions on Accelerating Development of Circular Economy*, *the State Council’s Notification on Recent Work for Constructing the Energy Saving Society*, and *the Notification on Accelerating Structural Adjustment of Industries with Surplus Energy Generation*. Ministries under the State Council, local People’s Congress and local governments have formulated and promulgated more than 660 rules and local regulations for implementation of national environmental protection laws and regulations, according to their mandates.

China has established a system of environmental protection standards. Environmental protection standards include the environmental quality standard, the pollutant emission (control) standard, the environmental standard sample standard, and so on. By the end of 2005, the state had issued over 800 national environmental protection standards and provinces (municipalities directly under the State Council) such as Beijing, Shanghai, Shandong and Henan had formulated over 30 local environmental protection standards.

2.2.2 Responsibilities of government departments involved in POPs management

I. Responsibilities of related central government departments on POPs management

In the central government, apart from the State Environmental Protection Administration, departments involved in POPs management include: the Ministry of Foreign Affairs, the National Development and Reform Commission, the Ministry of Science and Technology, the Ministry of Public Security, the Ministry of Civil Administration, the Ministry of Finance, the Ministry of Construction, the Ministry of Railways, the Ministry of Communications, the Ministry of Agriculture, the Ministry of Commerce, the Ministry of Health, the General Administration of Customs, the State General Administration for Quality Supervision and Inspection and Quarantine (AQSIQ), the General Administration of Civil Aviation (CAAC), the State Administration of Work Safety (SAWS) and the State Electricity Regulatory Commission.

Responsibilities of these agencies in POPs management are as follows:

State Environmental Protection Administration (SEPA): As the competent department responsible for environmental protection under the State Council, its main functions in implementation of the Stockholm Convention include: formulating national environmental protection guidelines and policies; developing related environmental standards, environmental protection regulations and environmental protection programs; organizing work in environmental monitoring, statistics and information; carrying out overall supervision and management on environmental protection of the whole country; participating in international

environmental protection activities on behalf of the state; and coordinating and supervising domestic environmental convention implementation activities. It is the leading agency and national focal point of China for the implementation of the Stockholm Convention.

Ministry of Foreign Affairs: As the competent department in charge of foreign affairs, it is responsible for: implementing the national overall diplomatic policies and country specific diplomatic policies to maintain the utmost benefits for China, on behalf of the state and the government; managing multilateral and bilateral foreign affairs as well as foreign affairs concerned with Hong Kong and Macao Special Administrative Regions; managing various foreign affairs concerning treaties and laws; participating in international negotiations of related treaties including the Stockholm Convention on POPs; and assisting related agencies in reviewing domestic policies and laws related to convention implementation.

National Development and Reform Commission (NDRC): As the macro-economy regulatory department, NDRC is responsible for: studying and formulating national economic and social development plans and strategies, keeping overall balance and giving guidance to overall economic institutional reform; developing environmentally friendly industrial policies, including policies on resources saving and comprehensive utilization, cleaner production and circular economy, and restriction or elimination of outdated production techniques, equipment, and products so as to promote sustainable development strategy. Additionally, NDRC is responsible for: the formulation of industrial development policies relating to pesticides and other persistent organic pollutants; the approval of enterprise sites and the licensing of production; and, together with departments concerned, organize development, replication and production facility construction of alternative technologies and products to persistent organic pollutants.

Ministry of Science and Technology (MoST): As the national competent department for science and technology management, it is responsible for: proposing macro-strategies in science and technology development and guidelines, policies and regulations on economic and social development promoted by science and technology; studying and solving important issues regarding economic and social development promoted by science and technology; identifying the overall arrangements and priority fields of scientific and technological development; promoting construction of the national science and technology innovation system; and facilitating the establishment of the nation's facility in science and technology innovation and strengthening the national capacity in this aspect. It is responsible for or participates in: basic research on POPs mechanisms; research on application of substitution and control technologies; and promotion of transformation and application of related scientific results.

Ministry of Public Security: As the competent department for public security, it is responsible for maintaining social security and combating law-breaking and criminal activities. In terms of POPs management, according to the *Regulation on Hazardous Chemicals Safety Management*, it is responsible for highly toxic chemicals control, including supervision and management of highly toxic chemicals production, storage and consumption enterprises, and issuance of purchase warrants to organizations and individuals that purchase highly toxic chemicals and permits for highway transportation of highly toxic chemicals.

Ministry of Civil Affairs: As the competent department for social affairs administration, it is responsible for: formulating basic guidelines and policies on social administration; proposing the civil affairs administration development plan; and providing guidance for reform and development in the civil affairs field. It is responsible for registration and annual examination of national associations, transprovincial (autonomous regions, municipalities directly under the

State Council) associations and international organizations' offices in China. It supervises activities of these organizations and investigates into their illegal activities and deal with them accordingly. In terms of POPs management, the Ministry of Civil Affairs is mainly involved in the funeral and interment sector management.

Ministry of Finance: As the macro-regulatory department in charge of financial revenues and expenses as well as fiscal and tax policies under the State Council, it is mainly responsible for: formulating and implementing national fiscal and tax development strategies, guidelines and policies, mid and long term plans, reform schemes and other relevant policies; participating in formulation of various macro-economic policies; developing annual central budget and final accounts drafts and organizing their implementation; and managing central public financial expenses. In terms of POPs, the Ministry of Finance is responsible for: formulating fiscal and tax policies related to convention implementation; arranging domestic funding for convention implementation; requesting and accepting GEF grants for convention implementation projects on behalf of the country; and supervising and managing use of the grants.

Ministry of Construction: As the competent department for construction administration, it is responsible for: studying and formulating guidelines, policies, regulations, and standards on urban and rural planning and construction, municipal public affairs and related sector management; formulating development strategies and mid and long term programs for related fields or sectors; and providing guidance for their implementation. It is in charge of POPs related sectors such as construction, municipal waste treatment, sewage and sludge treatment, and termite prevention and control.

Ministry of Railways, Ministry of Communication and General Administration of Civil Aviation (CAAC): As the competent agencies, respectively, for railways, communication and transportation administration and civil aviation under the State Council, they are responsible for formulating and supervising implementation of development strategies, guidelines, policies and regulations in communication and transportation sectors which they are in charge of, including supervision and control of transportation of POPs and other hazardous chemicals by railways, expressways, waterways and airplanes.

Ministry of Agriculture: As the competent department for agricultural and rural economic development, it is responsible for: formulating and supervising implementation of agricultural and rural economic development strategies and mid and long term development plans; and studying and formulating agricultural policies. In terms of pesticides management, it is responsible for pesticides registration, use and market management. It is also responsible for formulation of pesticide POPs-related agricultural management policies and regulations and supervision of their implementation, as well as organization of or participation in the development, application and replication of alternative products/ technologies of pesticide POPs.

Ministry of Commerce: As a constituent department of the State Council in charge of domestic and foreign trade and economic cooperation affairs, it is responsible for: formulating development strategies, guidelines and policies on domestic and foreign trade and international economic cooperation; drafting laws and regulations on domestic and foreign trade, international economic cooperation and foreign investment; formulating the management measures for goods in domestic circulation and for import and export and drafting the catalogue of goods in domestic circulation and for import and export; and conducting license management on domestic circulation and import and export of restricted commodities. In terms of POPs management, it is responsible, together with related agencies, for issuing a catalogue of POPs

which are restricted or banned in imports and exports.

Ministry of Health: As the competent department for health administration, the Ministry of Health is responsible for: drafting guidelines and policies on health affairs; participating in formulating relevant health laws and regulations; putting forward development plans for the health care system; formulating health technical rules and standards, and supervising their implementation. It is also responsible for: overall planning and coordination of health resources allocation for the whole country and guiding implementation of health plans in different regions; organizing all country health education; formulating prevention plans on diseases causing serious harm to human health; organizing comprehensive prevention and control measures for serious diseases; and publicizing lists of infectious diseases to be quarantined and monitored. In terms of POPs management, the Ministry of Health is responsible for: formulating relevant health standards; monitoring POPs residues in food; evaluating POPs threats to human health; performing related supervision and enforcement; managing safe use of POPs in disease prevention; and developing measures for the prevention and control of poisoning.

General Administration of Customs (GAC): As the highest authority in China's customs system, it is responsible for overall management of customs for the whole country and supervision and management of boundary entry and exit. Its concrete functions include: supervising and managing boundary entry and exit transportation tools, goods and commodities, collecting customs duties and other taxes, and compiling customs statistics; and investigating smuggling and seizing contraband. This includes supervision and management of POPs import and export and compilation of statistics on POPs import and export.

General Administration of Quality Supervision, Inspection and Quarantine: It is responsible for quality and measure management, entry and exit commodity inspection, entry and exit health quarantine, entry and exit animal and plant quarantine, certification verification and standardization as well as regulation enforcement. In terms of POPs management, it is responsible for: issuing production permission for hazardous chemicals and their packages and containers; supervising and managing quality of hazardous chemicals and their packages and containers; performing safety supervision over special equipment like boilers and pressure vessels; implementing compliance management on labelling of imported and exported chemicals; conducting sample tests on foods and other products which are possibly polluted by POPs; and administers punishment or other law enforcement actions for illegal activities or unqualified products.

State Administration of Work Safety: As the national agency competent for comprehensive supervision and management of work safety, its responsibilities in POPs management include: comprehensively supervising and managing safety in the production of hazardous chemicals; supervising and inspecting the enforcement of policies, laws and regulations relating to safety in the production of hazardous chemicals; and organizing the formulation of regulations, specifications and standards on safety in production. It is also responsible for: examining safety facilities in construction, renovation and expansion projects for enterprises which produce or store hazardous chemicals listed in the POPs Convention; examining the location and safety affairs of enterprises producing packages and containers of hazardous chemicals; issuing licenses for hazardous chemical business; conducting registration of domestic hazardous chemicals and supervision of them as well; and issuing and managing licenses for safety in the production of hazardous chemicals in production enterprises.

State Electricity Regulatory Commission (SERC): It is responsible for: supervising electrical power for the whole country; establishing the uniform electrical power regulatory system;

studying and proposing suggestions on formulation and amendment of laws and regulations on electrical power supervision; and formulating rules and regulations on electrical power supervision and market operation. In terms of POPs management, it is mainly responsible for supervision and management of the use and disposal of PCBs-containing electrical equipment.

II. Specially established convention implementation institutions and their responsibilities

National Coordination Group for Convention Implementation (NCG): As the national coordination mechanism of the Chinese government for implementation of the Stockholm Convention, it is responsible for reviewing and implementing national guidelines and policies on POPs management and control, and coordinating important issues related to POPs management and convention implementation.

Office of the National Coordination Group for Convention Implementation (CIO): As the office under the National Coordination Group for Convention Implementation, it is acting as the focal point for China's implementation of the Stockholm Convention. It is responsible for establishment and improvement of convention implementation management information mechanisms, as well as organization, coordination and management of convention implementation activities. In detail, it is responsible for: carrying out work assigned by the NCG; conducting convention policy study and organizing convention negotiations; coordinating and organizing related department and agencies to formulate the counterpart policies, regulations and standards and promote their implementation; coordinating and organizing related departments and local government for selection, preparation, application and execution of national convention implementation projects; providing the local government with guidance in convention implementation activities; carrying out publicity, education and training activities; and conducting evaluation of convention implementation performance.

III. Responsibilities of local governments

Based on the NIP and taking into consideration local needs, the local governments: formulate related local policies and plans and organize their implementation; investigate into and deal with non-compliance activities; organize publicity, education and training on local convention implementation activities; and assist in preparation and implementation of national projects related to the convention implementation.

2.2.3 Related international commitments and obligations

The Chinese government has always been active in international environmental conventions and has entered into more than 30 international treaties on environmental protection and resource conservation since the 1980's. International conventions related to the Stockholm Convention include the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* (Basel Convention) and the *Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade* (Rotterdam Convention).

On March 22, 1990, the Chinese government signed the Basel Convention, which came into effect in China in 1992. It is stipulated in the *Solid Waste Pollution Prevention and Control Law* which was issued in 1995 and amended in 2004. China forbids dumping, stockpiling and disposal of solid wastes outside its boundary, and administrative and criminal penalties will be imposed on illegal import of solid wastes. Local governments should construct hazardous

wastes disposal facilities according to plans.

On August 24, 1999, the Chinese government signed the Rotterdam Convention, which came into effect in China on June 20, 2005. The Chinese government has taken effective measures to fulfill obligations under the convention, including adoption of the prior informed consent procedure for import and export of some poisonous chemicals and pesticides, and prohibition or restriction measures on some poisonous chemicals.

2.2.4 Laws and regulations related to POPs

The *Environmental Protection Law* is a comprehensive law on environmental protection. Article 33 of the law is directly related to POPs management, which stipulates that “production, storage, transportation, sale and use of poisonous chemicals and goods containing radioactive substances must abide by related national stipulations to prevent environmental pollution”. The *Law on Water Pollution Prevention and Control*, the *Law on Air Pollution Prevention and Control*, the *Law on Marine Environmental Protection*, the *Law on Environmental Impact Assessment*, and the *Law on Solid Wastes Pollution Prevention and Control* all stipulate pollution prevention and control requirements from different perspectives, which can be used for POPs management. Currently, China does not have any law or regulation specifically addressing POPs.

The regulation closest to the management of intentionally produced POPs is the *Regulations on Safety Management of Hazardous Chemicals* issued by the State Council in 2002, which makes stipulations on production, sale, use, import and export, as well as monitoring and control of key hazardous substances. Intentionally produced POPs are within the scope of the regulation.

Production: According to the *Regulations on Safety Management of Hazardous Chemicals*, a license system is applied to the production and sale of hazardous chemicals. In order to implement the system, related agencies issued the *Measures for the Administration of Operating Licenses for Hazardous Chemicals* in 2002, the *Implementation Measures for Safety Production License of Hazardous Chemical Production Enterprises* in 2004, and the *Implementation Measures for Safety License of Hazardous Chemicals Construction Projects* in 2006. In the field of pesticides production management, the *Regulation on Pesticides Management* published in 1997 and later revised in 2001 specifies the country’s license system for pesticides production.

Use (Production sites): Management on use (production sites) of hazardous chemicals mainly follows provisions set in the *Regulations on Labor Protection in Workplaces Using Toxic Substances* issued in 2002, the *Provisions on Safe Use of Chemicals in Workplaces* issued in 1996, and criteria set in the *Limits on Occupational Contact of Harmful Factors in Workplaces* (GBZ2-2002).

Import and export: Following articles in international conventions and trade rules such as the *London Guidelines for the Exchange of Information on Chemicals in International Trade* and the *Rotterdam Convention*, China implements an import and export registration system. It promulgated the *Regulations on Environmental Management of the First Import of Chemicals and the Import and Export of Toxic Chemicals* in 1994, the *Detailed Rules on Registration for Environmental Management on the First Import of Chemicals and the Import and Export of Toxic Chemicals* in 1995, and the *List of Toxic Chemicals Strictly Prohibited from Import and Export* in 2005, which includes DDT, hexachlorobenzene, chlordane and mirex. In December 2005, the *No. 116 Notice on the List of Goods Prohibited from Import* (the Sixth Group) and the

List of Goods Prohibited from Export (the Third Group) was promulgated, in which dieldrin, endrin, PCBs and Dioxins were added in the *List of Goods Prohibited from Import*; and aldrin, dieldrin, endrin, heptachlor, toxaphene, PCBs and Dioxins were added in the *List of Goods Prohibited from Export*. According to the requirements on import and export management in paragraph 2 of Article 3 of the Convention, China is yet to identify the trade management system between Parties and non-Parties.

Packaging: China implements a management system in which packages and containers for hazardous chemicals are produced in designated locations. It issued the *Management Measures on Production of Packages and Containers for Hazardous Chemicals in Designated Enterprises* in 2002. Related criteria include the *Classification and Code of Dangerous Goods* (GB6944-2005), the *General Rules for Precautionary Label of Hazardous Chemicals* (GB/T15258-1999) and the *Packaging Labels of Hazardous Chemicals* (GB190-1990).

Storage: Relevant enterprises should build storage facilities meeting the requirements set in the *General Rules on Storage of Commonly Used Hazardous Chemical Goods* (GB15603-1995). For construction, renovation and enlargement of such facilities, the Chinese government adopts a strict approval system and promulgated the *Measures for Safety Examination of Hazardous Chemicals Production and Storage Construction Projects*

Transportation: The Chinese government has formulated related regulations on railway, waterway and highway transportation. It has promulgated the *Management Regulations on Railway Transportation of Hazardous Goods*, the *Regulations on Waterway Transportation of Hazardous Goods*, and the *Regulations on Road Transport of Hazardous Goods*, as well as the the *General Technical Conditions on Transportation Packaging of Hazardous Goods* (GB12463-90).

Dioxin management: China has formulated and implemented Dioxin release control standards on a few sectors, such as waste incineration. For release reduction and control of Dioxins, technical requirements and technical guidelines can be developed according to the *Environmental Impact Assessment Law*, the *Clean Production Promotion Law*, the *Regulations on Environmental Management of Construction Projects*, etc. so as to achieve the convention implementation goals.

POPs-containing wastes: China lists POPs-containing wastes in the *National Catalogue of Hazardous Wastes* and conducts management according to the *Law on the Prevention and Control of Environmental Pollution by Solid Wastes*, the *Measures for Prevention and Control of Environmental Pollution Caused by Abandoned Hazardous Chemicals*, and the *Technology Policy for the Prevention and Control of Pollution Caused by Hazardous Wastes*. For business activities related to POPs-containing wastes, the *Measures on Hazardous Wastes License Management* is followed. For import and export of POPs-containing wastes, provisions stipulated in the *List of Goods Prohibited from Import*, the *Provisional Regulations on Wastes Import Management for Environmental Protection*, the *Measure for Manifest Management on Transfer of Hazardous Wastes* and the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* are followed. In order to prevent POPs-containing wastes from polluting the environment, the Chinese government has promulgated the *Measures on Prevention and Control of Environmental Pollution Caused by Abandoned Hazardous Chemicals*, formulated and implemented a series of standards, including the *Standard on Hazardous Wastes Identification*, the *Standard for Pollution Control on Hazardous Waste Storage*, the *Pollution Control Standard for Landfilling of Hazardous Wastes*, and the *Pollution Control Standard for Hazardous Wastes Incineration*.

POPs contaminated sites: The *Measures on Prevention and Control of Environmental Pollution Caused by Abandoned Hazardous Chemicals*, promulgated and implemented in 2005, stipulates that hazardous chemicals production, storage and use enterprises shall report the environmental rehabilitation plans to environmental protection agencies above county level for approval. It will also realize environmental rehabilitation of the contaminated sites within the time limit prescribed by the environmental protection agencies in the case that they change the production line, stop production, close down or dissolve and in the case that the sites have been polluted.

The *Regulations on Pesticide Management* makes stipulations on production, import and export, sale and use of pesticides, and establishes corresponding management systems including the pesticides registration system and the pesticides production permit system, which are applicable for the management of pesticide POPs

Table 2-7 Departmental Regulations on Management of Hazardous Chemicals and Pesticides

Name	Issuing department	Effective Date	Relevance to POPs management
<i>Measures for the Administration of Operating Licenses for Hazardous Chemicals</i>	The former State Economic and Trade Commission	2002	Management of business licenses related to POPs
<i>Implementation Measures for Safety Production License of Hazardous Chemical Production Enterprises</i>	State Administration of Work Safety State Administration of Coal Mine Safety	2004	Management of the qualifications of enterprises engaged in POPs production
<i>Management Measures on Production of Packages and Containers for Hazardous Chemicals in Designated Enterprises</i>	The former State Economic and Trade Commission	2002	Management of designated manufacturers of packaging and containers for hazardous chemicals
<i>Measures for Management on Registration of Hazardous Chemicals</i>	The former State Economic and Trade Commission	2002	POPs registration management
<i>Detailed Rules for Registration of Hazardous Chemicals (Trial)</i>	The former State Economic and Trade Commission	2000	
<i>Implementation Measures for Safety License of Hazardous Chemicals Construction Projects</i>	State Administration of Work Safety, State Administration of Coal Mine Safety	2006	Safety check of POPs production and storage enterprises
<i>Regulations on Environmental Management of the First Import of Chemicals and the Import and Export of Toxic Chemicals</i>	State Environmental Protection Administration, General Administration of Customs, The former Ministry of Foreign Trade and Economic Cooperation	1994	Import and export management related to POPs
<i>Detailed Rules on Registration for Environmental Management on the First Import of Chemicals and the Import</i>	The former SEPA	1995	

<i>and Export of Toxic Chemicals</i>			
<i>Provisions on Safe Use of Chemicals in Workplaces</i>	The former Ministry of Labor, The former Ministry of Chemical Industry	1996	Safety management related to POPs production sites
<i>Measures for Management on Production license of Industrial Products</i>	State Bureau of Quality Supervision and Inspection	2002	Production license management related to POPs
<i>Regulations for the Safe Use of Pesticides</i>	The former Ministry of Agriculture, Animal Husbandry and Fishery, Ministry of Health	1982	Management related to the use of POPs
<i>Regulations on Prevention of Termites in Urban Housing</i>	Ministry of Construction	1999	Management related to the use of POPs
<i>Management Regulations on Railway Transportation of Hazardous Goods</i>	Ministry of Railways	1996 (Amended)	Management related to the transportation of POPs
<i>Regulations on Waterway Transportation of Hazardous Goods</i>	Ministry of Communications	1996	Management related to the transportation of POPs
<i>Regulations on Road Transport of Hazardous Goods</i>	Ministry of Communications	1993	Management related to the transportation of POPs
<i>List of Chemicals with Severe Toxicity (Amended in 2002)</i>	The former State Administration of Work Safety, Ministry of Public Security, SEPA, Ministry of Health, State Bureau of Quality Supervision and Inspection, Ministry of Railways, Ministry of Communications, General Administration of Civil Aviation	2002	Includes POPs
<i>List of Hazardous Chemicals</i>	The former State Administration of Work Safety	2003	Includes POPs
<i>Reference No. of Dangerous Goods and Classification GB6944-2005</i>	SEPA	2005	Includes POPs
<i>List of Dangerous Goods GB 12268-90</i>	SEPA, the State Standardization Commission	2005	Includes POPs

2.2.5 Critical approaches and procedures in the management of POPs chemicals and pesticides

China has established a safety management system and formulated relevant policies on hazardous chemicals. In recent years, the Chinese government has strengthened the safety management of hazardous chemicals and begun to form the management system with the *Regulations on Safety Management of Hazardous Chemicals* as the core.

Relevant policies have been formulated on pesticides since the 1970's, and gradually formed a relatively sound pesticides management system with the *Regulation on Pesticides Management*

as the core.

Management involved in intentionally produced POPs includes the following.

- (1) The approval system for pesticides and hazardous chemicals construction projects. The application to build, enlarge or renovate construction projects for pesticides and hazardous chemicals production (including primary production, formulation process and packaging) should be approved by related national or local agencies before licenses can be applied to industrial and commercial administrative agencies.
- (2) Policies on production management related to intentionally produced POPs, including a pesticides quality standard system, a pesticides production permission system, a pesticides registration system and a hazardous chemicals safety registration system.
- (3) Elimination of obsolete products and techniques. The National Development and Reform Commission issued the *Guiding Catalogue of Industrial Structure Regulation (2005)*, which stipulates that DDT, PCBs, hexachlorobenzene, chlordane and mirex should be eliminated as obsolete products.
- (4) China has formulated management regulations and standards for packaging, storage and transportation.
- (5) The registration verification management system for pesticides import and export. Organizations are required to apply for “pesticides import and export registration verification” to the Ministry of Agriculture every time they import or export any pesticide.
- (6) Franchised operation management. Systems have been established such as business permission for pesticides and hazardous chemicals, quality supervision and management in marketing and advertisement examination.
- (7) Strengthening management of usage, including: the system for safe use of pesticides, the management system for pesticide residues on agricultural products, the management system for the use of pesticides on foods with no social effect of pollution, green foods and organic foods, and the system for the safe use and registration of hazardous chemicals.
- (8) Management measures for environmentally sound disposal of wastes. It is required that safety measures be taken in destruction and disposal of abandoned hazardous wastes and the measures should be approved by the public security and environmental protection agencies where the measures take place.
- (9) The system for supervision of management of prevention and control of environmental pollution caused by pesticides and hazardous chemicals. The State Environmental Protection Administration takes charge, and the Ministry of Agriculture, the State Safety Supervision and Management Administration and other agencies carry out supervision and management of prevention and control of environmental pollution caused by pesticides and hazardous chemicals within their respective administrative scopes.

2.3 Evaluation of the status quo for POPs

2.3.1 Pesticide POPs in Annex A of the convention

I. Production, use, import and export

Pesticide POPs in Annex A of the convention include: aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex and toxaphene. China used to produce toxaphene, hexachlorobenzene, chlordane, heptachlor and mirex. There are 45 enterprises in China that produce the pesticide POPs in Annex A of the convention (including primary production and formulation plants), which are located in 18 provinces and municipalities of China (Figure 2-4).

Production and use of toxaphene and heptachlor were stopped in the 1970's, and the production and use of hexachlorobenzene were stopped in 2004. Currently, chlordane and mirex are still in production and use, mainly for termite prevention and control in buildings.

By the end of 2004, China had produced a total of 110,000 tons of pesticide POPs in Annex A of the convention, of which about 30,000 tons were directly used in fields as agricultural pesticides for pest prevention and control, in termite prevention and control and in disease control, and about 80,000 tons of hexachlorobenzene were used as raw materials in the production of pesticides (sodium pentachlorophenate (Na-PCP) and pentachlorophenol (PCP)) and some was exported. Figure 2-4 shows the distribution of enterprises producing pesticide POPs listed in Annex A of the Convention in China. Table 2-8 presents the production and use situation of enterprises producing pesticide POPs listed in Annex A of the Convention.

Table 2-8 Production situation and uses of pesticide POPs in Annex A at the end of 2004

Type	Production capacity (tons/year)	Output (tons/year)	Import/export (tons/year)	Number of production enterprises	Highest historical output (tons/year, year)	Accumulated output (tons)	Uses
Chlordane (Crude oil)	1,760	363	0	5	843 (1999)	~9,000	Termite prevention and control
mirex	677	15	0	3*	31 (2000)	~160	Termite elimination and control

* Mirex production enterprises also produced chlordane.

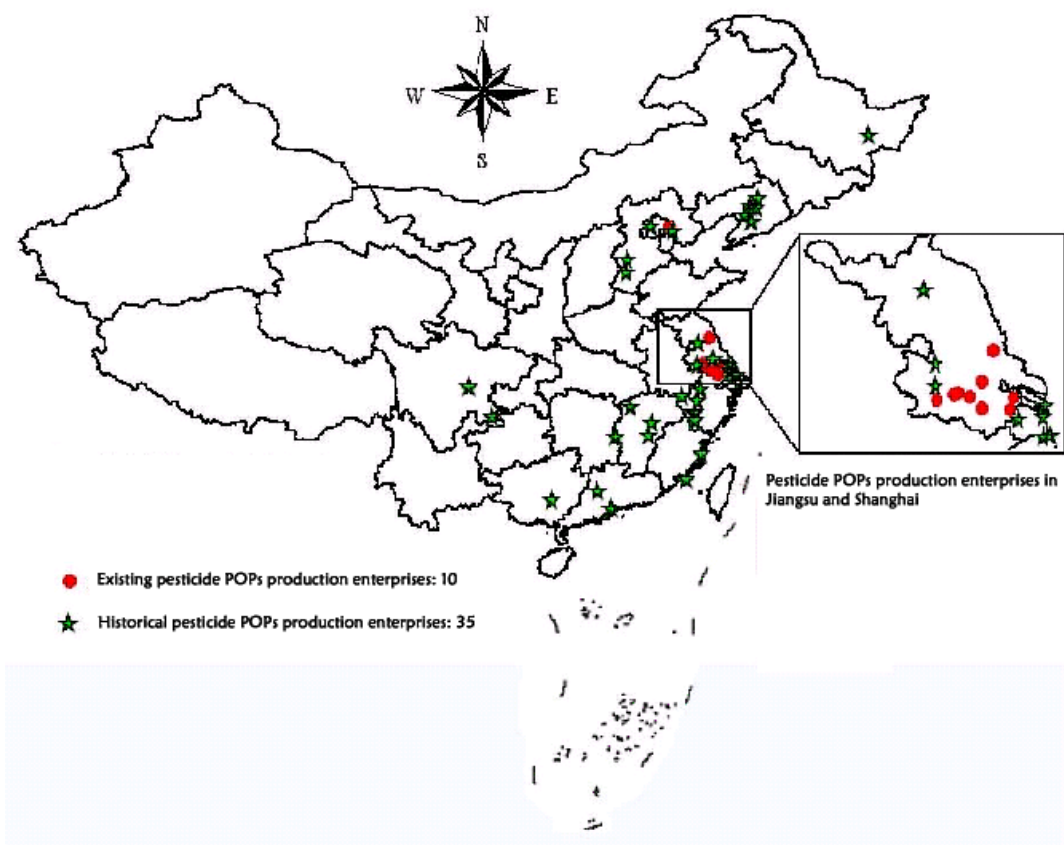


Fig. 2-4 Distribution of enterprises producing pesticide POPs in Annex A

Table 2-9 Basic situation of other pesticide POPs that were never produced or the production of which has stopped

Type	Status	Highest historical annual output (tons, year)	Accumulated output (tons)	Usage field in the past
Hexachlorobenzene	Used to produce, stopped in 2004	7,365 (1990)	>79,278	PCP raw materials
toxaphene	Used to produce, stopped in the 1980s	3,740 (1973)	20,660	Agriculture (grain and cotton production)
heptachlor	Used to produce, stopped in the 1980s	11 (1968)	<100	Railway crosssties
aldrin	Used in research, never produced in scale			
dieldrin	Used in research, never produced in scale			
endrin	Never researched, produced or used			

A. Hexachlorobenzene (HCB)

China began to produce HCB in 1958, and in total there were 6 production enterprises. These enterprises used hexachlorocyclohexane (HCH) to produce lindane and HCB. Due to control of HCH production and use after 1983, the production of lindane and, consequently, the production of HCB were reduced drastically. At present there is only one enterprise that

continues production in the whole country. Accumulative output of HCB after 1988 was 79,278 tons, of which 78,323 tons were used to produce Na-PCP and PCP, accounting for 98.8% of the total output, and the rest of which was mainly used to produce fireworks. In 1990, the maximum HCB output of the whole country was 7,365 tons. Production was reduced year by year after 2000 and completely stopped in 2004.

HCB was banned from direct use as a pesticide and never registered by the Ministry of Agriculture. HCB was used as an intermediate to produce Na-PCP, which used to be employed for schistosomiasis prevention and control.

There has been no HCB import since 1998 in China. There were small quantities exported from 1998 to 2000, which were 134 tons, 112 tons and 9 tons, respectively, and accounted for 255 tons in total¹⁶.

B. Chlordane

China began to develop chlordane in the 1950's, and there have been approximately 20 production enterprises in total, all of which have been small scale. The output reached 465 tons in 1974 and enterprises have gradually stopped production since 1975. However, because termites were very severe in the southern area, and there was a lack of high efficiency and low cost medicaments for prevention and control, some production facilities were established in succession after 1988. In 2004, there were a total of five enterprises having the capacity to produce chlordane crude oil and emulsifiable solution. Output of chlordane crude oil reached 834 tons in 1998 and was 363 tons in 2004. Customs data show that there has been no import or export of chlordane since 1998.

Before 1980, chlordane production enterprises were all state-owned and their products were all purchased and sold by the governments. After 1988, chlordane production enterprises were basically privately owned and their outputs were mainly based on market demand. According to use statistics, in 2002-2004, chlordane crude oil was mainly used for termite prevention and control in buildings (about 95%) and a little was used for protection of dams (about 4%) and electric wires and cables (1%).

Between 1997 and 2001, there were great differences in the amounts of chlordane used in termite-affected provinces. Chlordane use mainly depends on the termite hazard situation and use habits. Areas affected by termites are shown in Figure 2-7. In the 19 provinces, municipalities and autonomous regions where termite prevention and control activities were carried out, 18 used varying amounts of chlordane, except Tianjin. Among them, Zhejiang Province used the most and following it were: Jiangsu, Guangdong, Sichuan, Jiangxi, Hunan, Guangxi, Anhui, Hubei, Fujian, Chongqing, Shaanxi, Shanghai and Shandong. Beijing used the least, and followed by Hainan, Yunnan and Liaoning. Table 2-10 shows the estimates of chlordane used in China. In order to implement the Stockholm Convention, the provinces have taken measures to reduce the amount of chlordane used, and the amount used by the whole country has gradually decreased.

¹⁶ This data was provided by the General Administration of Customs.

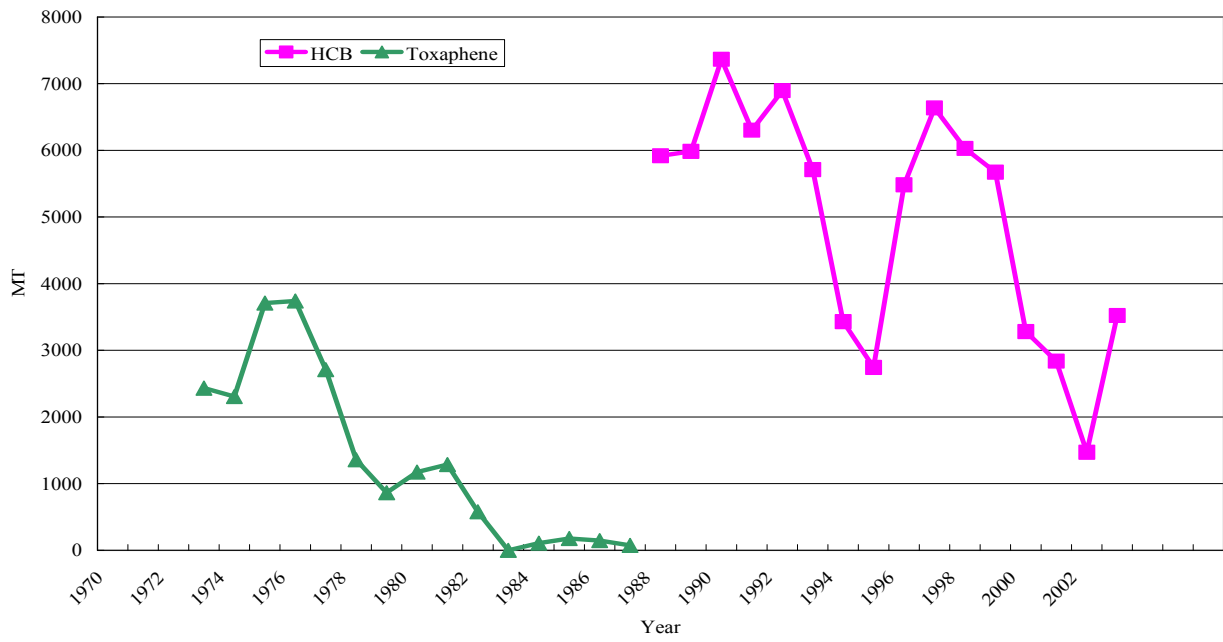
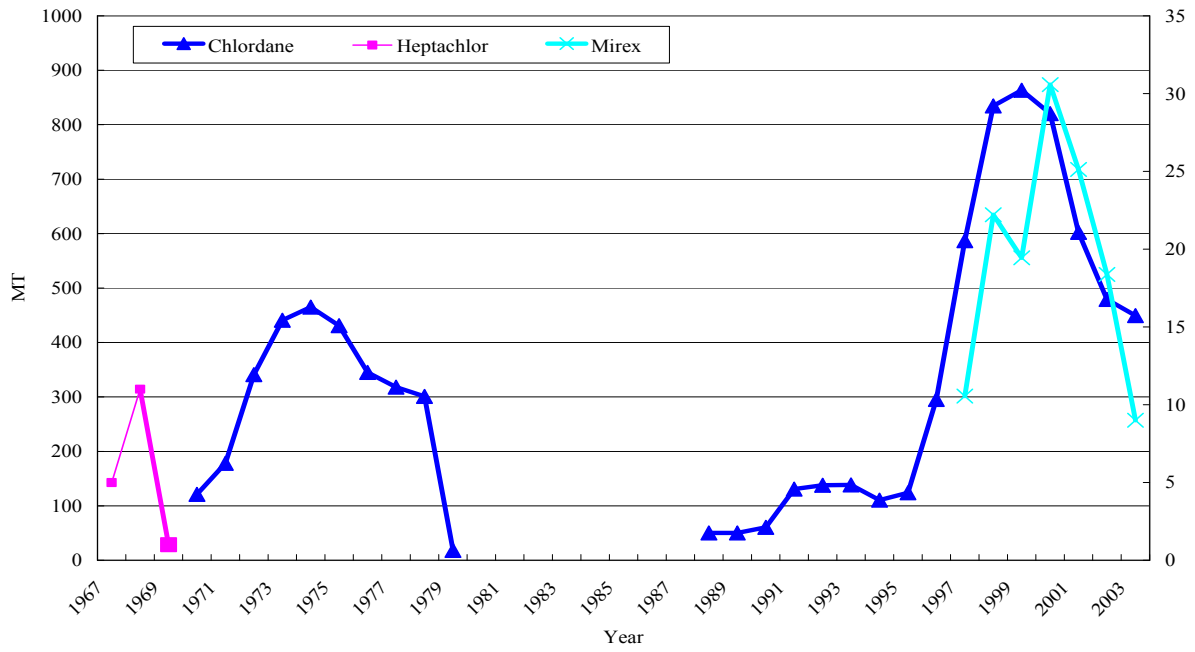


Fig. 2-5 Outputs of pesticide POPs in Annex A
of the convention over the years (ton/year)
 * Chlordane uses the primary coordinate (MT);
 heptachlor and mirex use the secondary coordinate (ton)



Fig. 2-6 Termite affected areas in China (in shadow)

Table 2-10 Chlordane use distribution in China from 1997-2001

Province (municipality)	Annual Consumption (ton)*					Five years accumulated consumption (ton)
	1997	1998	1999	2000	2001	
Zhejiang	93.6	114.0	110.3	108.4	84.8	511.2
Jiangsu	86.2	111.1	103.4	96.4	78.8	475.8
Guangdong	40.0	64.5	100.7	99.5	70.9	375.6
Sichuan	58.2	67.6	65.6	32.2	41.1	264.6
Jiangxi	37.9	48.7	53.0	69.2	48.2	256.9
Hunan	30.4	31.6	34.3	36.1	37.6	170.1
Guangxi	7.6	14.6	20.6	22.3	21.3	86.4
Anhui	8.6	10.2	11.9	17.0	23.0	70.7
Hubei	9.1	6.4	5.5	5.1	6.5	32.5
Fujian	12.1	3.8	7.8	1.0	0.8	25.5
Chongqing	4.7	5.1	4.8	4.6	3.8	23.0
Shanxi	5.0	3.0	1.0	0.0	0.0	9.0
Shanghai	1.1	0.8	0.8	0.7	0.8	4.2
Shandong	0.4	0.4	0.4	0.3	0.3	1.8
Liaoning	1.0	0.0	0.0	0.0	0.0	1.0
Yunnan	0.0	0.0	0.5	0.3	0.3	1.0
Hainan	0.5	0.0	0.0	0.0	0.0	0.5
Beijing	0.0	0.0	0.0	0.003	0.001	0.003

* These data come from those used by termite prevention and control institutions which have been investigated.

C. Mirex

Production and development of mirex began at the end of 1960. There were a total of 7 production enterprises in history, all of which produced chlordane at the same time. Production was gradually stopped after 1975 and was restricted at the beginning of 1980. Due to the need for termite prevention and control in the southern area, some production facilities were constructed and put into operation after 1997. At present, three enterprises have mirex production capacity. In 2000, mirex output peaked at 31 tons and was 15 tons in 2004.

Existing mirex production enterprises are all privately owned and base their production on market demand. The products are used in termite control and elimination. Mirex has never been directly used for agricultural insect pest control and never been listed in the catalogue of the Ministry of Agriculture. But until now, it is still the main medicament for killing termites and there is no ideal alternative. Among the termite affected provinces, municipalities and autonomous regions, only 15 used mirex. The provinces in the southeast that are severely affected by termites use a large amount of mirex, including: Jiangxi, Guangxi, Fujian, Guangdong, Zhejiang and Jiangsu. In the disease control field, Shanghai, Jiangsu, Yunnan, Shaanxi and Guangxi used to use mirex to kill domestic ants.

D. Toxaphene, heptachlor and other pesticide POPs

Toxaphene, being one of the major pesticides with large production in China at the beginning of 1970's, was used for protection of grains and cotton from bollworms and aphides. Historically, there were 16 production enterprises in total, with the maximum output being 3,740 tons. These enterprises stopped production successively after 1979, with the output reduced year by year. The production completely stopped in 1985, and the accumulative output was about 20,660 tons.

Heptachlor production accumulated to about 20 tons from 1967-1978 and stopped in 1978, with the facilities being dismantled. Heptachlor was mainly used for prevention and control of termites in railway crossties. The pesticide registration agencies never approved registration and use of heptachlor as a pesticide.

In terms of aldrin, dieldrin and endrin, there were only synthetic experiments carried out in China and no industrial production.

Customs statistics data show that there was no import or export of toxaphene, heptachlor, aldrin, dieldrin or endrin.

II. Existing policies, laws and regulations

China had listed HCB, chlordane, mirex, aldrin, dieldrin, endrin and heptachlor in documents related to chemicals such as: the *General Appellation of Pesticides* (GB4839-1998), the *Name List of Hazardous Goods* (GB12268-2005) (item 1 toxic goods in category 6), *Annex I Poisonous Chemicals banned or Strictly Restricted (Group 1)* in the *Regulation on Management of Import of Chemicals for the First Time and Import and Export of Poisonous Chemicals*, and carried out control and management on them as poisonous chemicals. Regarding pesticide POPs in Annex A of the convention, China has the following policies and regulations.

Production: the *Guiding Catalogue of Industrial Structure Regulation (2005)* lists HCB,

chlordane and mirex in the elimination category as obsolete products.

Use: the *Regulation on Safe Use of Pesticides* issued in 1982 classifies toxaphene and chlordane as pesticides with medium toxicity, and stipulates that they shall not be used on fruit trees, vegetables, tea plants, traditional Chinese medicine, tobacco, coffee, pepper and citronella. Chlordane can only be used for mixing into cereal feedstuff, to prevent and control underground pests. The *Public Notice No. 199* issued by the Ministry of Agriculture listed toxaphene, aldrin and endrin as “pesticides clearly banned from use”. The *Cosmetics Sanitation Standard* (GB7916-1987) stipulates that HCB and endrin are banned from use as cosmetics components. HCB was put in the *List of Medicament Banned from Use* related to meat and poultry in 2002. Article 10 of the *Regulation on Termite Prevention and Control in Urban Houses* amended in 2004 points out that medicaments whose production is approved by relevant agencies should be used for prevention and control of termites in urban houses.

Import and export: the *Pesticide Varieties Banned and Strictly Restricted from Use in China* attached to the *Notification of the General Administration of Customs on Issues Related to Exemption of the Value Added Tax in Import of Pesticides and Technical-Grade Pesticides* issued on September 3, 2001, includes all pesticide POPs. The No. 29 and No. 65 notifications of the State Environmental Protection Administration have complemented the list of management on import and export of pesticide POPs in Annex A of the convention. Dieldrin has been listed in the category 6 poisonous goods in the *Classification and Indication of Hazardous Chemicals in Common Use* (GB13690-92).

Environmental monitoring: the *Technical Route on Environmental Monitoring* effective on June 13, 2003, lists heptachlor as one of the items in general monitoring of surface water. The *Guideline on Construction of Diseases Prevention and Control Center Laboratories at the Province, Prefecture and County Levels* lists heptachlor as a pesticide monitoring item.

Food standard: the *Maximum Pesticide Residue Limit in Foods* (GB2763-2005) stipulates the residue limits of aldrin, dieldrin and heptachlor in grains, vegetables, meat and eggs.

In terms of management of pesticide POPs in Annex A of the convention, the main problems include: there is no regulation on pollution limits in the specific exemption production and use of chlordane and mirex; and related environmental standards are not sound enough.

III. Alternative technologies

Since 1999, some pesticide production plants and termite prevention and control research institutions have successively developed chlordane alternatives. Some products such as fenvalerate, deltamethrin, cypermethrin, bifenthrin, chlorpyrifos, fipronil, imidacloprid, acetamiprid, sulfuramid, hexaflumumron and avermectin have been introduced to the market for trial.

In terms of mirex alternatives, although hexaflumumron, diflubenzuron and boride have been used in foreign countries for elimination and control of termites, their effects are not good when compared with mirex. Moreover, termites that cause great damage in China are different types than foreign ones and their living habits are also different due to differences in climate, soil and foods. Therefore, even if hexaflumumron, diflubenzuron and boride have some effects in termite elimination and control in foreign countries, they need to be further studied as termite elimination and control medicaments in China.

In the international community, at the same time that medicaments with high efficiency, low toxicity and low residues are used to substitute chlordane and mirex, prevention and control by chemical medicaments alone is no longer an ideal alternative, and integrated pest management (IPM) technologies have been applied. IPM technologies advocate minimized use of chemical medicaments and apply physical and biological technologies such as heat treatment, cold treatment, microwave or electroshock, metal barrier, sand burial, and bait monitoring to prevent pests. Therefore, in selection of technologies to substitute chlordane and mirex in China, we should open our minds and carry out integrated treatment instead of being limited to the use of medicaments.

IV. Research data

China has not organized or conducted systematic monitoring on pesticide POPs in Annex A in the environment. Some researchers have carried out measurements at some places at different times and discovered the existence of pesticide POPs in Annex A in the air, water, soil and foods, but there is no continuous and systematic data. A small number of data shows that, except in sediments and shellfish, POPs concentration in other media is low.

V. Specific exemptions

China conducted exemption registration for the production and use of chlordane, mirex and HCB for specific purposes, with a term of five years. In this, chlordane and mirex are used for termite prevention and control and HCB is used as the intermediate for Na-PCP production.

2.3.2 PCBs in Annex A of the convention

I. Production, use, import and export

The production of PCBs oils began in 1965 in China and there were 4 production enterprises. The production was gradually stopped from 1974 to the 1980's. According to preliminary investigation and analysis, the accumulative production output was about 7,000 to 10,000 tons.

PCBs oils can be used to produce many kinds of PCBs-containing products. PCBs usage is divided into three categories (according to the extent of contact of PCBs in products with the outside): closed use (such as capacitors, transformers and current stabilizers), semi-closed use (such as heat transmission oil, hydraulic oil and vacuum pump oil) and open use (such as printing ink, dope and fireproofing paint). There were 11 enterprises producing the aforementioned PCBs-containing products before 1980 (see Figure 2-7), of which 3 produced PCBs-containing electrical capacitors, and 8 produced PCBs-containing paint. All of them stopped production in the beginning of the 1980's.

Preliminary investigations show that out of all PCBs produced in China, about 1000 tons were for open use such as paint additives, about 6000 tons were used as an impregnant for electrical capacitors, and the rest needs further verification. The capacitors were YL, YLW series power-factor correction capacitors, CL series serial capacitors, and RLS and RLST series electrical heating capacitors. According to technical requirements on PCBs-containing capacitors in the 1970's, it is estimated that each capacitor contains 10-15 kilograms of PCBs oil and hence the accumulative output of PCBs-containing capacitors was about 500,000.

During the 1950's and the 1980's, China used to import PCBs-containing electrical equipment from other countries without being informed, most of which were specific transformers and

capacitors for large facilities. The imported PCBs-containing electrical devices were mostly distributed in large enterprises and the rest were distributed in the electrical power sector. At present, it is beginning to be found that there were PCBs contained in about 500 capacitors (already discarded) and about 50 transformers (already discarded) in the electrical power sector; but the data for most imported PCBs-containing electrical devices, possibly in large enterprises in the non-power sector, are not available.

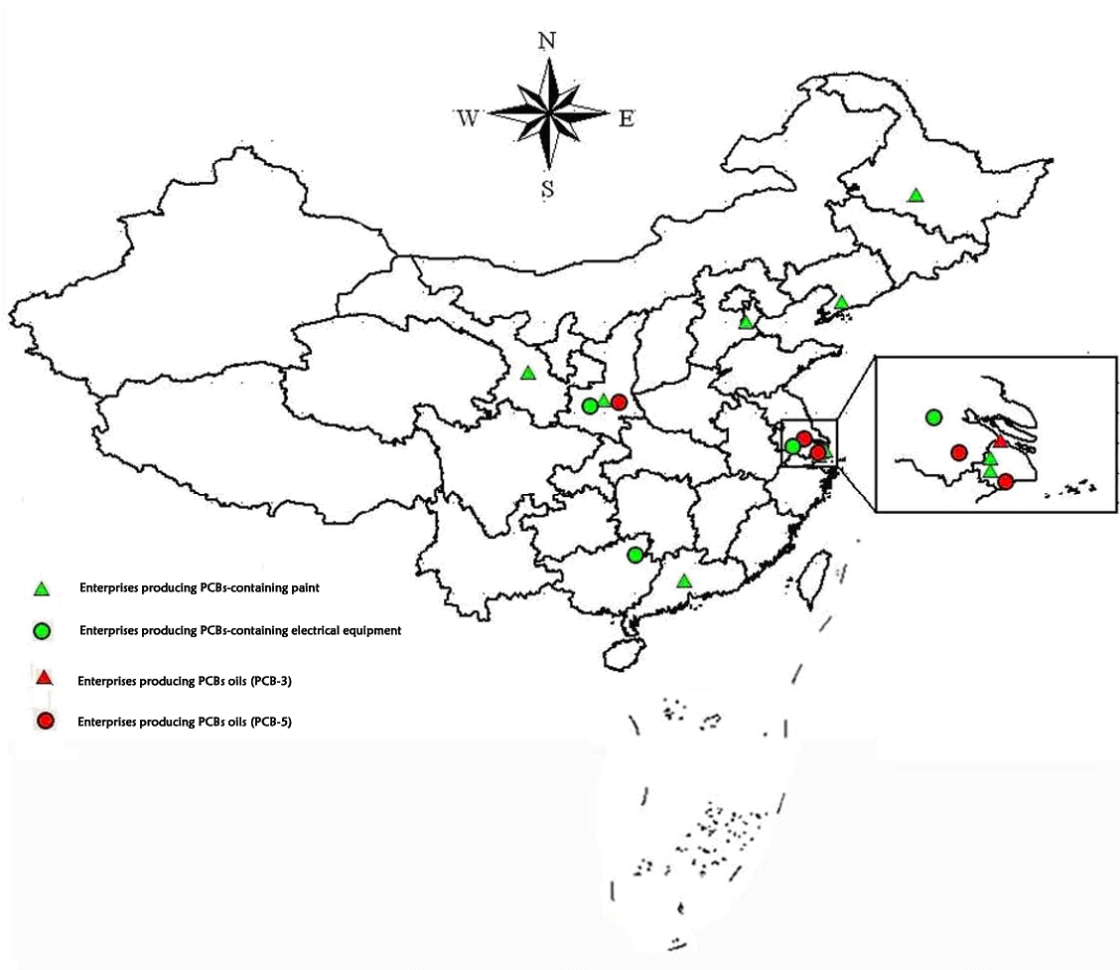


Fig. 2-7 Distribution of identified enterprises producing PCBs oils, PCBs-containing electrical equipment and PCBs-containing paint

II. PCBs-containing devices which are in use

PCBs-containing devices in use include PCBs-containing capacitors and transformers. Existing investigation results show that PCBs-containing electrical devices in use in China are capacitors, most of which exist in different types of large enterprises and institutes of the non-power sector. At present, there are about 460 PCBs-containing capacitors found in use in the power sector of the whole country. Because of the extent of sectors involved, the large number of enterprises, the weakness in management, and the long time period, investigations have encountered great difficulties concerning PCBs-containing capacitors in the non-power sector of China. Investigations in Liaoning, the demonstration province, show that there are about 554 PCBs-containing capacitors in use in the non-power sector in the province, the distribution of which is shown in Figure 2-8.

Due to a lack of labeling, PCBs-containing capacitors in use need to be identified mainly through detection. At present, 288 transformer samples in stockpile/use have been selected from the two demonstration provinces of Zhejiang and Liaoning for inspection. Sixteen transformers have been identified as containing PCBs, of which 7 stockpiled transformers contain PCBs exceeding 50 ppm. Due to limits in monitoring and investigation, further investigations need to be carried out to find out the number and status of PCBs-containing transformers in use in China.

Investigations show that there is a large number of electrical devices temporarily in stockpiles in the power sector of the whole country. However, due to lack of monitoring, the concrete number of PCBs-containing electricity devices is not available. Besides, except PCBs-containing capacitors and transformers, no other electrical equipment (mainly small-sized devices) in use has been found containing PCBs.

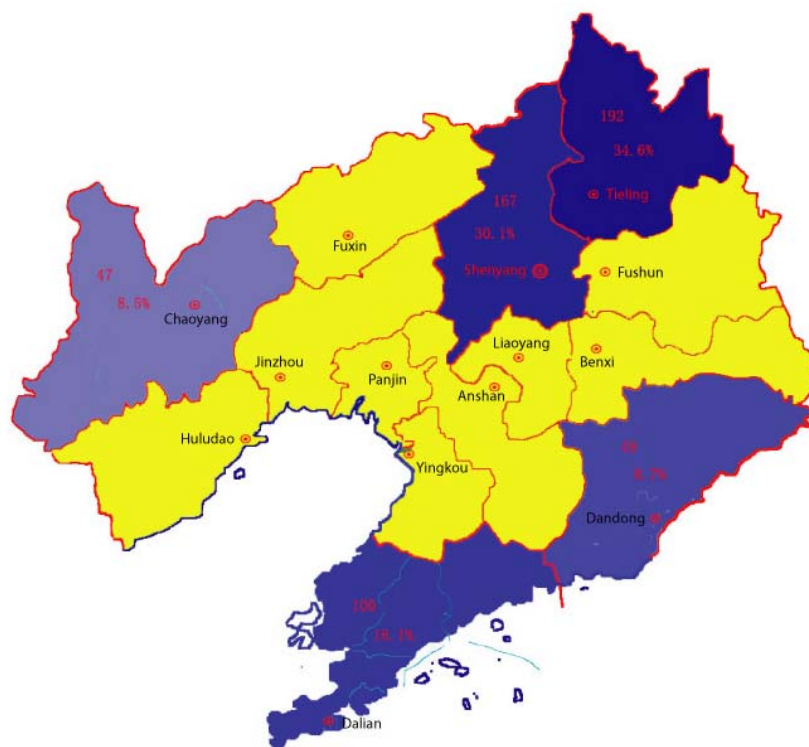


Fig. 2-8 Distribution of PCBs-containing capacitors in use in the non-power sector in Liaoning Province

III. Existing policies, laws and regulations

In January 1974, the Chinese government promulgated the decree on stopping production of capacitors with PCBs, as well as the decree on restricting import of electrical equipment containing PCBs. In the 1990's, regulations on PCBs pollution prevention and control and standards on PCBs pollution control were formulated. The *Standard on Control of Pollution caused by Hazardous Wastes Incineration* (GB 18484-2001), formulated in 1999 and effective in 2000, stipulates the technical performance indicators for PCBs waste incinerators. Regulations, technical criteria and standards already issued related to management of electrical equipment containing PCBs and their wastes are listed in Table 2-11.

Table 2-11 The policy and regulatory framework related to PCBs

Category of policies and regulations	Name and core requirements	Issuing time and agency
Policies and regulations on management of electrical equipment containing PCBs	The <i>Notification on Changing Dipping Materials for Electrical Capacitors</i> , requiring stopping the use of PCBs in production of capacitors	1974, the former Ministry of First Machinery Industry
	The <i>Notification on Issues Related to Prevention of Pollution Caused by PCBs</i> , requiring stopping the import of electrical equipment containing PCBs	1979, the former National Economic Commission and the State Council Environmental Protection Leading Group
	The <i>Notification on Strengthening Management of Scrapped PCBs Capacitors</i> , requiring strict ban on sale and dismantlement of scrapped capacitors containing PCBs	1990, the former National Environmental Protection Agency
	The <i>Regulation on Prevention of PCBs-Containing Electrical Equipment and Their Wastes from Polluting the Environment</i> , making clear stipulations on collection, storage, transportation, disposal, treatment, control and import of electrical equipment containing PCBs, and PCBs wastes	1991, the former National Environmental Protection Agency and the Ministry of Energy
	The <i>Regulation on Operation Management of PCBs-Containing Electrical Equipment</i> , making stipulations on preventing leakage in the processes of checking, transportation, installation, operation, dismantlement of PCBs-containing electrical equipment in use in the power sector of the whole country, strengthening safety measures, preventing leakage from the bottom of equipment, and removing and examining PCBs leakage in operation.	1991, the former Ministry of Energy
Policy and regulation on management of commodities containing PCBs	The <i>Notification on Reporting the Status of PCBs-Containing Electrical Equipment and Their Wastes</i> , requiring investigating the use and storage situations of electrical equipment containing PCBs	1995, the former National Environmental Protection Agency
	The <i>Regulation on Environmental Management of the First Import of Chemicals and Import and Export of Toxic Chemicals</i> , requiring that import and export of PCBs-containing commodities must be approved and get environmental protection registration certificate	1994, the former National Environmental Protection Agency, the General Administration of Customs and the Ministry of Foreign Economic and trade Cooperation
Policies and regulations on management of foods containing PCBs	The <i>Limits of Pollutants in Foods</i> (GB2762-2005) stipulates that PCBs contents should be less than 2mg/kg in sea products, shells, shrimps and algae, among which contents of PCB138 and PCB153 should be less than 0.5mg/kg	2005, the Ministry of Health
	The <i>Limits of Toxic and Harmful Substances in Pollution-Free Foods and Aquatic Products</i> , making control limits for PCBs in aquatic foods and products	2001, the Ministry of Agriculture
	The <i>Action Plan on Food Safety</i> , requiring	2003, the Ministry of Health

monitoring of PCBs in foods		
Environmental quality standards on PCBs in environmental factors	The <i>Regulation on Prevention of PCBs-Containing Electrical Equipment and Their Wastes from Polluting the Environment</i> , making interim provisions on water (3 ppb) and soil (Grade I 50 ppm and Grade II 500 ppm) quality control values	1991, the former National Environmental Protection Agency
	The <i>Standard on Surface Water Environmental Quality</i> sets the PCBs control standard for surface water as centralized drinking water sources	1999, the State Environmental Protection Administration
	The <i>National Quality Standard on Sea Sediments</i> (GB18668-2002)	2002, the State Oceanic Administration
	The <i>Limits of Pollutants in Foods</i> (GB2762-2005)	2005, the Ministry of Health and the State Standardization Commission

IV. PCBs elimination technologies

China has not carried out PCBs pollutants elimination or replacement work on electrical equipment containing PCBs, and lacks related technologies.

V. Research data

China has not conducted systematic monitoring of PCBs in the environment and has only conducted research monitoring in some areas. Some of the monitoring results are shown in Table 2-12. Research shows that PCBs exist in sediments of a few estuaries and marine coastal areas.

Table 2-12 Demonstration data of PCBs concentrations
in environmental media in research reports of some areas

Place	Time	Testing method	Sampling/sample number	Environmental media	PCBs concentrations	Reference literature
Wenzhou and Taizhou in Zhejiang province	1999	GC-ECD*	4 sampling sites	Atmospheric gas	191 - 641 ng/m ³	[1]
		GC-ECD	3 sampling sites	Atmospheric aerosol	0.191 - 0.373 µg/g	
Sehznhen City	2001	GC-ECD	8 samples	Atmospheric gas	453.19 ± 35.12 pg/m ³	[2]
West Port of Xiamen	1998	GC-ECD	9 sampling sites	Water	0.08 - 1.69 ng/L	[3]
Jiulong River Estuary	1999	GC-ECD	15 sampling sites	Surface water	0.36 - 150 ng/L	[4]
		GC-ECD	13 sampling sites	Clearance water	209 - 3869 ng/L	
Minjiang River	1999	GC-ECD	13 sampling sites	Water	0.20 - 2.47 µg/L	[5]
		GC-ECD	5 sampling sites	Clearance water	3.19 - 10.86 µg/L	
The four estuaries of Zhujiang River	2000	GC-ECD	Not available	Water of Humen estuary	2.701 ng/L	[6]
		GC-ECD	Not available	Water of Hengmen estuary	0.999 ng/L	
		GC-ECD	Not available	Water of	2.828 ng/L	

				Jiaomen estuary		
		GC-ECD	Not available	Water of Doumen estuary	1.161 ng/L	
Daya Bay area	1999	GC-ECD	14 sampling sites	Hypo-surface water	91.7 - 1355.3 ng/ L	[7]
Taihu Lake	2000	GC-ECD	Not available	Bottom mud	0.983 ng/g	[8]
Qingdao marine coastal area	1997-1999	GC-ECD	9 sampling sites	Surface sediments	0.65-32.9 ng/g dry weight	[9]
Zhujiang River estuary	1996	GC-ECD	13 sampling sites	Shells	82.8 -615.1 ng/g fat weight	[10]

* Gas chromatography - electron capture detection

2.3.3 Chemicals in Annex B of the convention

I. Production, use, import and export

China began producing DDT in the 1950's, and there used to be 11 production enterprises (Figure 2-9). The highest annual output was 21,164 tons and the accumulative output by 2004 was 464,000 tons. Figure 2-10 shows DDT production over the years. Since the State Council decided to stop DDT production in the whole country in 1983, there remain only two enterprises producing technical grade DDT and one enterprise producing DDT preparations. Since 1995, the output of technical grade DDT in China has been maintained at the level of 5,000 - 6,000 tons/year, and the output in 2004 was 3,945 tons.

China stopped large scale production and agricultural application of DDT in the 1980's. In the disease control field, DDT was used to kill mosquitoes and pests in the malaria prevailing areas (mainly in the south of the Yangtze River) by the indoor residential spraying method. But since 2001, DDT has not been used in normal disease control. In 2004, DDT was used as the intermediate in dicofol production, which accounted for more than 73% of the total national use amount. Some was exported for disease vector control, accounting for about 23% of the total, and a little was used in antifouling paint, accounting for about 4% of the total.

Currently, there are 3 to 5 enterprises producing technical grade dicofol, one of which basically produces dicofol with self-produced DDT in a closed system. The annual output of dicofol of the whole country is about 3,000-4,000 tons. Besides that, there are about 19 antifouling paint production enterprises using DDT as the additive, with the annual average consumption of about 250 tons.

From 1998 to 2004, there were some DDT exports each year, but there was no DDT import. DDT was mainly exported to Africa and Southeast Asia for malaria prevention and control.

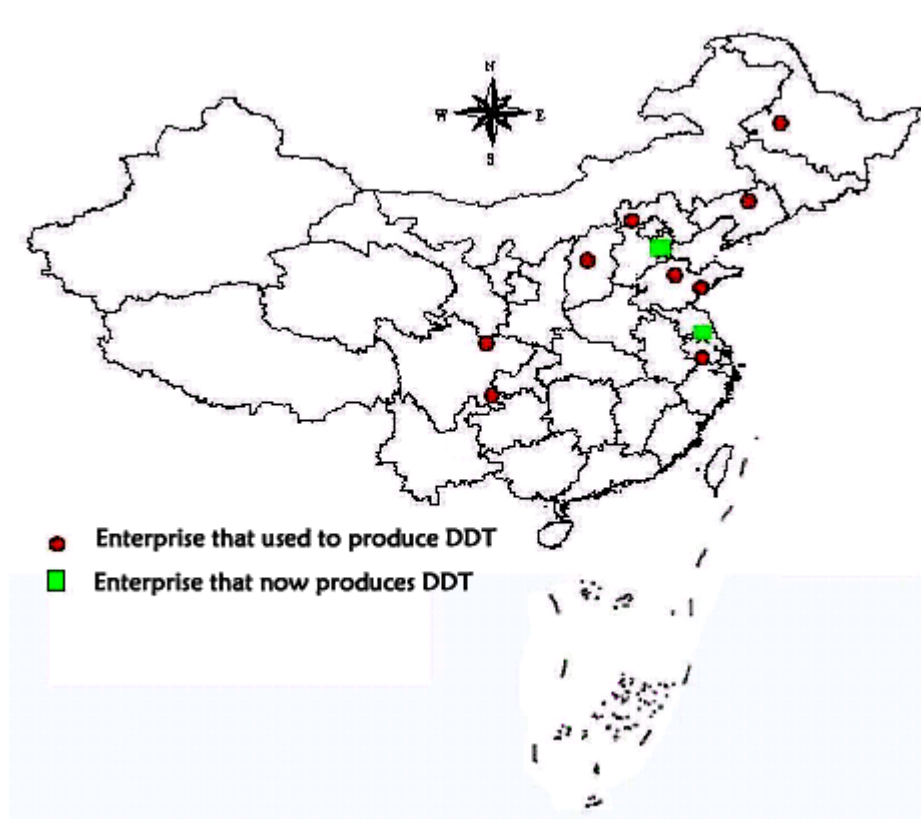


Fig. 2-9 Distribution of DDT production enterprises

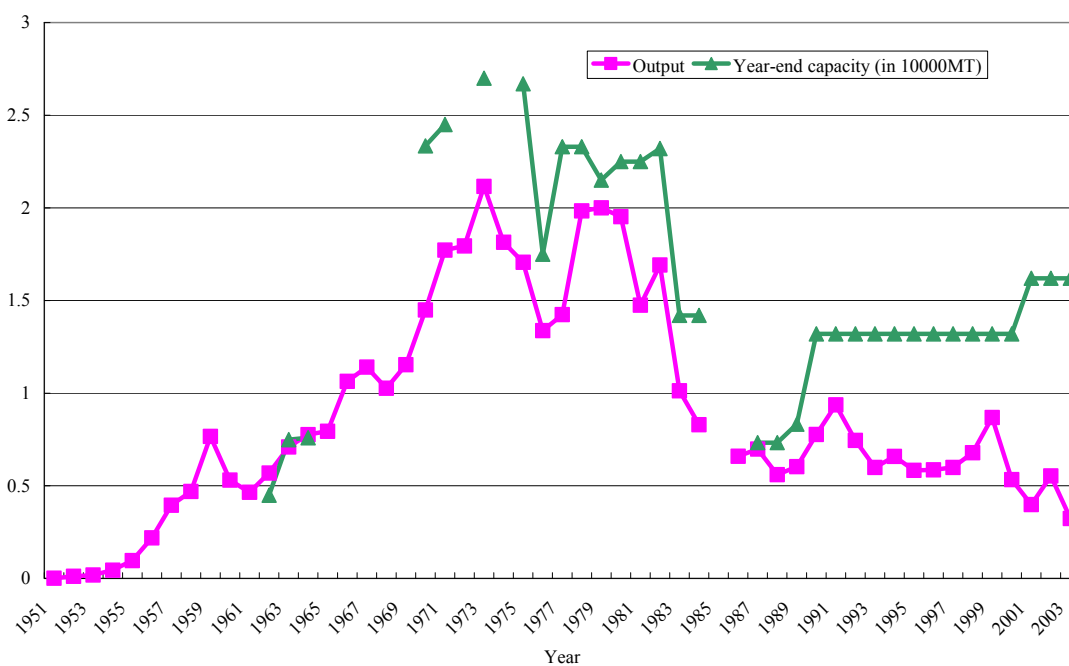


Fig. 2-10 Output/production capacity of technical grade DDT in China

From 1998 to 2004, total DDT export was 2,535 tons, and there was no import. See Table 2-13.

Table 2-13 DDT exports of China from 1998 to 2004¹⁷

Year	1998	1999	2000	2001	2002	2003	2004
DDT (ton)	256	328	83	401	318	448	700

II. Existing policies, laws and regulations

DDT has been listed in documents such as the *Name List of Hazardous Goods* (GB12268-90) (item 1, toxic goods in category 6) and the *Classification and Indication of Hazardous Chemicals in Common Use* (GB13690-92) (toxic goods in category 6), and has been controlled and managed as a key chemical.

Production management: In 1983, the State Council decided to stop DDT pesticide production. In 1991, the State Council issued the *Notification on Strengthening Management of Pesticides and Animal Drugs*, which stipulates that from 1992 on, no enterprises or individuals are allowed to produce and sell DDT except DDT produced by state designated enterprises for export and special purposes approved by the government. The *Regulation on Strengthening Management of the Pesticide Sector* issued in 1995 forbids registration and production of DDT as a pesticide. The compulsory standard HG3699/3700-2002 issued in 2002 stipulates the limit of DDT in technical/emulsifiable dicofol. The *Guiding Catalogue of Industrial Structure Regulation* issued in 2005 lists DDT as an obsolete product and requires its elimination according to the plan to implement the convention. In addition, the *Sanitation Standard on Design of Industrial Enterprises* (TJ36-79) sets the tolerance limit for DDT concentrations in the air of workplaces. The *Contact Limits of Harmful Elements for Professionals in Workplaces* (GBZ2-2002) sets the contact limit of DDT for professionals.

Use management: The *Regulation on Safe Use of Pesticides* issued in 1982 identifies DDT as a pesticide with medium toxicity and bans it from use on fruit trees, vegetables, tea plants, traditional Chinese medicine, tobacco, coffee, pepper, citronella, etc. The *Notification on Strengthening Management of Pesticides and Animal Drugs* issued in 1991 forbids agricultural application of DDT from 1992 on. The *Technical Scheme on Malaria Prevention and Control* issued in 1989 stipulates that DDT is allowed to be used indoors for disease vector control but it is banned from use outdoors. According to the No. 199 Notice of the Ministry of Agriculture issued in 2002, DDT has been listed as a pesticide banned from use. The *Standard on Cosmetic Sanitation* (GB7916-87) forbids the use of DDT as a component of cosmetics. In 2002, DDT was listed in the *Name List of Medicament Banned from Use* in the category of meat and poultry for export.

Import and export management: The annex of the *Regulation on Management of the First Import of Chemicals and Import and Export of Toxic Chemicals* issued in 1994 lists DDT in the first batch of toxic chemicals banned or strictly restricted. The *Pesticide Varieties Banned and Strictly Restricted from Use in China* attached to the *Notification of the General Administration of Customs on Issues Related to Exemption of the Value Added Tax in Import of Pesticides and Technical-Grade Pesticides* issued in 2001 lists all pesticide POPs. The No. 65 notification of the State Environmental Protection Administration¹⁸ again identifies DDT as a toxic chemical strictly banned from import and export.

Food and environment standards: The *Maximum Residue Limits of Pesticides in Foods*

¹⁷ Data were provided by the General Administration of Customs.

¹⁸ The Catalogue on Toxic Chemicals Strictly Restricted from Import and Export in China

formulated in 2005 (GB2763-2005) lists DDT in the indicators for control and sets DDT residue limits in grains, vegetables, meat, eggs, etc. The *Standard on Drinking Water Quality* (GB5749-85), the *Standard on Fishery Water Quality* (GB 11607-89), the *Standard on Soil Environmental Quality* (GB 15618-95), the *Standard on Seawater Quality* (GB 3097-1997), the *National Standard on Marine Sediment Quality* (GB18668-2002), and the *Standard on Surface Water Environmental Quality* (GB3838-2002) also list DDT as a indicator for monitoring and set corresponding standards.

III. Alternative technologies

In terms of disease control, deltamethrin, cypermethrin and propoxur can be used as alternatives. Besides environmental treatment (cleaning mosquito media breeding sites), biological prevention and control and integrated management of pest vectors are all alternative technologies that can be considered. Currently, the substitute used most is deltamethrin, and a little cypermethrin and propoxur are also used. Since the production cost and sales price of DDT is relatively low, if alternatives are used to kill mosquitoes, costs incurred will multiply several-fold. DDT has a unique advantage, especially for emergent epidemic prevention after grave disasters. Therefore, it is necessary to develop alternatives with good effects and an appropriate price for epidemic prevention after disasters.

DDT containing antifouling paint has always been used for ship maintenance in some areas of China, because of its long and good antifouling effects and low price, and there are no mature alternatives/alternative technologies which are efficient, cheap and environmentally friendly at the same time. Preliminary analysis finds alternatives that can be further developed and promoted include: biocide antifouling paint selected from those accredited by international authorities with low concentrations, high efficiency and environmentally friendly features; capsaicin which has a strong repelling effect without killing marine organisms; and improved alkali silicate antifouling paint.

Currently, using DDT as the intermediate to produce dicofol is the only technical option, at home and abroad. The way to eliminate DDT release is to eliminate non-closed production of dicofol and implement minimum control standards on DDT release in the closed production process and on DDT residues in products. Taking integrated pest management (IPM) as the alternative technology or reducing use of dicofol will further reduce DDT releases.

IV. Research data

Although DDT was banned as a pesticide in China, it can still be detected in air, water, sediment, field soil, grains, vegetables, fruits, meat, animals and human tissue in many areas. However, most research data show that DDT concentrations are lower than relevant standards. Relevant data are shown in table 2-14.

Table 2-14 Demonstration data for DDT concentrations in different environmental media in some research documents

Region	Environmental media	Monitoring method	Number of samples	Time of monitoring	Total DDT level	Reference
					pg/m³	
Tianjin	particle	GC/ECD		2002	1,874	[11]
Haidian Beijing	Particle	GC/ECD		2002	401 - 962	[11]

Taihu lake	Gas	GC/ECD		2002	1,139	[12]
Water					ng/l	
Liaohe river	Water			1998-2000	7.04	[13]
Estuary of Jiulong river	Surface Water	GC/ECD		2000	19.24 - 96.64	[14]
Guanting Reservoir- Yongding River	Water	GC/ECD		2000	ND - 46.8	[15]
Tonghui River	Water	GC/ECD		2003	192.5 - 2651 31.58 - 344.9 134.9 - 3788	[16]
Estuary and Marine sediment					ng/g	
Liaodong Bay, Bohai Bay	Marine sediment	GC/ECD	18	2005	0.3 - 12.1	[17]
Guanting Reservoir of Yongding River	Sediment	GC/ECD		2001	0.3 - 1.9	[18]
Taihu of Yangtze River	Estuary sediment	GC/ECD GC/MS		2000	9.22 - 27.35	[19]
Wuhan segment of Yangtze River	Estuary sediment	GC/ECD		2001	0.18 - 36.01	[20]
Shuzhou River	Estuary sediment	GC/ECD	11	2004	27.27 - 82.06	[21]
Estuary of Minjiang River	Estuary sediment	GC/ECD GC/MSD		1999	28.79 - 52.07	[22]
Daya Bay of Zhujiang River	Estuary sediment	GC/ECD	18	1999	0.14 - 20.27	[23]

DDT concentrations in various foods of China in 2000 are shown in table 2-15.

Table 2-15 DDT concentrations in various foods of China in 2000¹⁹

Variety	Number of Samples	Average Concentration (ng/g)			Original National Standard* (ng/g)	Current National Standard* (mg/kg)
		p,p'- DDT	o,p'-DDT	p,p'- DDT		
Grains	80	4.1	7	14.1	200	0.05
Vegetables	88	0.8	1.3	0.8	100	0.05
Fruits	40	0.8	2.3	2.7	100	0.05
Meat and its products	41	5.6	1.3	1.8	200	
Content of fat is less than 10 % (calculated by original sample)						0.2

¹⁹ Bibliography [24]

Content of fat is more than 10 % (calculated by fat)						2
Fish	30	3.6	0.9	2.5	500	0.5
Eggs	51	2.5	0.5	1.5	1000	0.1
Milk powder	15	0.6	0.6	2.0	Converted to fresh milk	
Milk	5	5.7	25.5	1.3	100	0.02
Vegetable oils	10	0.2	0.5	1.0	500	
Tea-leaf	44	10.8	13.8	31.1	200	0.2

* The source of original standards is the *Standard on HCH and DDT Residue in Foods Such as Grains and Vegetables* (GB2763-81), and the source of new standards is the *Limits of Pollutants in Foods* (GB2763-2005).

Research and monitoring data show that DDT concentrations in environmental media and foods are decreasing constantly in China. Except for sediments and shellfish in few estuary and marine coastal areas, DDT concentrations in other environmental media and foods are lower than national standards. Production and use of dicofol is the main source of DDT pollution²⁰.

DDT has been detected in human milk in many areas of China. p,p'-DDT decreased from 1.8 mg/kg in 1982 to 0.24 mg/kg in 1998, and total DDT²¹ decreased from 7.71 mg/kg to 2.04 mg/kg. It can be concluded that since DDT was banned, DDT concentrations in human milk have obviously decreased.

V. Specific exemption and acceptable purposes

China has registered a specific exemption for production and use of DDT as the intermediate for dicofol production in a non-closed system. According to the convention requirement, this exemption will end by May 17, 2009. China will further evaluate the need to apply for extending such an exemption.

China has maintained production and use of DDT for emergent prevention and control of disease vectors. The COP will evaluate the need to continue use of DDT for disease vector control at least once every three years after May 2005.

China still produces and uses DDT as a closed-system site-limited intermediate for dicofol production. This purpose will end after a ten-year timeframe (May 17, 2014) and China will further evaluate the need to continue a second ten year period for such a purpose.

2.3.4 The chemicals listed in Annex C of the Convention

I. Release inventories of Dioxin, HCB and PCBs from various categories of sources

There exist Dioxin release sources in 62 subcategories within 10 main categories listed in the *Standardized Toolkit for Identification and Quantification of Dioxin Releases* in China. Due to great discrepancies in scale, technology, management, pollution control facility, environmental protection awareness, etc. of industrial enterprises, the release status of each source is

²⁰ Xing Huaqiu, Tong Zhu, etc, Contribution of Dicofol to the Current DDT Pollution in China, *Environ. Sci. Technol.* 2005, 39, 4385-4390

²¹ Containing p,p'-DDT, o,p'-DDT and p,p'-DDT.

considerably different from another.

Monitoring data on Dioxin releases and pollution research are quite insufficient in China. Due to limitations of analytical level and costs, relatively more monitoring and investigation was conducted on municipal solid waste incineration and monitoring and analysis for research of Dioxin releases, than was ever conducted in areas such as chlorinated phenols and their derivatives, chlorobenzene, sewage treatment, cement, iron and steel, papermaking and medical waste incineration. Such a small amount of monitoring and research data is not enough to determine precisely all emission factors for release sources of Dioxin. Pursuant to the *Standardized Toolkit for Identification and Quantification of Dioxin Releases*, and giving consideration to the existing monitoring and research data, this plan has estimated Dioxin releases in China in 2004 (See Table 2-16). Because there is no emission factor for Category 10 release sources (hot spots) in the *Standardized Toolkit for Identification and Quantification of Dioxin Releases*, releases for this category cannot be estimated.

Table 2-16 Inventory of estimated Dioxin releases in 2004

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
1	Waste incineration				610.47			1147.1	1,757.57
	11 Municipal solid waste incineration**	I	6,600,000 t	China currently has 54 municipal solid waste incineration plants, with daily incineration capacity of 16,907 tons. Based on actual testing, investigation and research, these plants were divided into four classes, for which emission factors were determined.	125.8			212.2	338
	12 Hazardous waste incineration	II	271,000 t	79 enterprises, having an annual disposal capacity of 678,000 tons, can be divided into three classes, for which emission factors for Category 2 to Category 4 in the Toolkit were chosen.	57.27			186	243.27
	13 Medical waste incineration	II	814,000 t	Cities across the country at the regional level generally have centralized disposal facilities for medical wastes, for which emission factors for Category 3 in the Toolkit were chosen.	427.4			748.9	1,176.3
	14 Light-fraction shredder waste incineration	IV	0	This type of waste was not specially incinerated, releases of which can be ignored.					0
	15 Waste wood and waste biomass incineration	IV	0	This type of waste was not specially incinerated, releases of which can be ignored.					0
	16 Sewage sludge incineration	IV	0	1 plant was put into operation at the end of 2004 and 1 plant was under construction, both having an annual disposal capacity of 160,000 t (dehydrated sludge) together.					0
2	Ferrous and non-ferrous metal production				2,486.2	13.5		2,167.2	4,667.0
	21 Iron ore sintering	II	30,465,300 t	There were 318 sintering machines in 2004. Based on testing results from and investigation and research of demonstration projects, emission factors for Category 2 in the Toolkit were adopted.	1,522.5			0.9	1,523.4
	22 Coke production	IV	210,000,000 t	By the end of 2003, there were 1,304 coke production enterprises and 2,710 coke ovens across the country. 105 coke ovens were	239.2	13.4			252.6

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
				newly built in 2004. Among these enterprises, large- and small-sized ones produced approximately 178,000,000 t coke and the rest produced approximately 32,000,000 t coke, for which emission factors for two categories in the Toolkit were adopted, respectively.					
23	Iron and steel production and foundries	II	274,707,000 t	According to statistics by China Iron & Steel Association, among 89 large- and medium-sized iron and steel enterprises, there were 15 enterprises with annual output of steel over 5 million tons, and 26 with annual output of steel over 3 million tons; enterprises with annual output of steel over 3 million tons produced over 60% of the total. The output of steel produced with electric arc furnace was 41,671,500t, the output of converter steel was 232,717,200t, the output of other steel was 318,200t, and the output of liquid iron produced with blast furnace was 257,000,000t. Emission factors for Category 2, Category 3 and Category 4 were adopted for electric arc furnaces, converters and other steel, and blast furnaces, respectively.	150.9			974.5	1,125.4
24	Foundries	IV	14,277,000 t	There were approximately 24,000 foundries, of which, key large- and medium-sized enterprises produced 3,725,900 t and other enterprises produced 10,551,100 t, for which emission factors for Category 3 and Category 4 in the Toolkit were adopted.	10.7			86.3	97
25	Hot-dip galvanizing plants	III	4,170,000 t	There were 38 continuous galvanizing lines of wide strips (>1000 mm) that were put into operation by the end of 2003, having annual output capacity up to 6.7 million tons. There were also tens of galvanizing lines of narrow strips. Based on results from research on foreign literature, emission factors were determined.	0.14			0.38	0.52

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
26	Secondary copper production	IV	1,160,000 t	There were 2 enterprises with annual waste use of over 100,000 tons, 6 enterprises with annual waste use of 50,000-100,000 tons, and about 2,000 small enterprises with annual use of waste copper below 5,000 tons. The total output of the 8 large-sized enterprises was 700,000 tons and that of small-sized enterprises was 460,000 tons, for which emission factors for Category 1 to Category 2 were adopted.	403			730.8	1,133.8
27	Secondary aluminum production	IV	1,660,000 t	There were over 2,000 enterprises all together, including 4 enterprises with annual output over 50,000 tons and 26 enterprises with annual output of 10,000-50,000 tons. The total output of enterprises ranking in the top 30 in terms of output was 500,000 tons, and other enterprises produced 1.16 million tons. Emission factors for Category 1 to Category 2 in the Toolkit were adopted.	133.5			332	465.5
28	Secondary lead production	IV	240,000 t	There were over 300 enterprises, including large- and medium-sized enterprises which produced 80,000 tons and other enterprises which produced 160,000 tons, for which emission factors for Category 1 to Category 2 in the Toolkit were adopted.	13.4			4	17.4
29	Secondary zinc production	IV	80,000 t	There were 2 enterprises with annual output over 10,000 tons, as well as 10 major enterprises, for which emission factors for Category 2 in the Toolkit were adopted.	8				8
210	Brass and bronze production	IV	Very little output						0
211	Magnesium production	IV	426,100 t	There were 49 enterprises with annual output over 5,000 tons. Magnesium produced with the Pidgeon process accounted for 99% of the total in China, and electrolytic magnesium was 1,182 tons. Emission factors for Category 2 to Category 3 in the Toolkit were adopted.	1.49	0.13		38.35	39.97
212	Thermal non-ferrous metal	IV	780,000 t	Gold output was 212.348 tons; chromium	0.16				0.16

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
	production			output was up to 3,700 tons, cobalt output up to 5,692 tons, and nickel output up to 68,616 tons.					
	213 Shredders	IV	Very little output	Releases of this type of pollution source can be ignored at the present stage.					0
	214 Thermal wire reclamation	IV	80,000 t	Data on open burning was not clear. The annual processing capacity of recovering metal from burning conductors in a centralized manner was 80,000 tons, for which emission factors for Category 2 in the Toolkit were adopted.	3.2				3.2
3	Heat and power generation				1,304.4			588.1	1,892.54
	31 Fossil fuel power plants	IV	986 million tons of coal fired	986 million tons of coal fired and about 12.4 million tons of heavy oil fired. No power plant with shale oil for generation. Releases from light fuel oil fired power plants can be ignored. The total quantity of natural gas consumption for electricity generation was 3,185.951 million cubic meters. Relevant emission factors in the Toolkit were adopted.	248.4			345.1	593.5
	32 Industrial boiler	IV	400 million tons of coal fired	Approximately 480,000 coal fired power boilers and 50,000 fuel (gas) fired power boilers, for which relevant emission factors in the Toolkit were adopted.	101			140	241
	33 Biomass power plants	IV	Ignored	There were a small number of small-sized power plants generating electricity using sugar cane residues, which can be ignored compared to the large number of thermal power stations.					0
	34 Landfill and biogas combustion	IV	3,749,410,000 m ³	The number of households using biogas was up to 15.41 million, for which relevant emission factors in the Toolkit were adopted.	0.54				0.54
	35 Stalk combustion	IV	257,120,000 t	Over 50% of stalk resources centralized in 9 provinces including Sichuan, Henan, Shandong, Hebei, Jiangsu, Hunan, Hubei and Zhejiang; a comparatively small amount of stalk resources distributed in the northwest	386			22.5	408.5

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
				part of China and in other provinces. Straw is mainly distributed in the provinces south of the Yangtze River, and stalks of wheat and corn are mainly distributed between the Yellow River and Yangtze River basins, as well as in such provinces as Heilongjiang and Jilin. Emission factors for Category 2 in the Toolkit were adopted.					
	36 Firewood combustion	IV		Fujian, Hubei, Hunan, Sichuan, Guizhou, Yunnan, and Hebei, among other provinces, were major provinces where firewood was consumed. Emission factors for Category 2 in the Toolkit were adopted.	299.5			17.5	317
	37 Household heating and cooking	IV	100,000,000 t coal fired	Coal consumption for civil use: 100 million tons; fuel oil consumption: 14,592,900 tons; fuel gas consumption: 4,984 million cubic meters. Emission factors were determined through research and investigation and by giving consideration to literature.	269			63	332
4	Production of mineral products				413.61				413.61
	41 Cement production	II	970,000,000 t	NSP (New Suspension Pre-heater Dry Process) process cement output: 315 million tons; rotary kiln cement output: 79 million tons; shaft kiln cement output: 576 million tons. Emission factors were determined in combination with demonstration projects.	365.3				365.3
	42 Lime production	IV	135,700,000 t	A great number of small- and medium-sized enterprises, for which emission factors for Category 2 in the Toolkit were adopted.	9.5				9.5
	43 Brick production	IV	770 billion pieces	A great number of enterprises. Merely according to a partial survey by Jiangxi Province, there were over 9,000 solid clay brick enterprises, for which emission factors for Category 2 in the Toolkit were adopted.	36				36
	44 Glass production	IV	18,790,000 t	Nearly 300 sheet glass enterprises, including about 53 large- and medium-sized ones, for which emission factors for Category 2 in the	0.28				0.28

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
				Toolkit were adopted.					
	45 Ceramics production	IV	95,000,000 t	China produced 9,620 million pieces of household china pottery and porcelain for daily use, 449,700 tons of industrial ceramics, and 80 million pieces of sanitary ceramics in the year. Emission factors for Category 2 were adopted.	1.9				1.9
	46 Asphalt mixing	IV	9,026,200 t	Comparatively large in quantity.	0.63				0.63
5	Transportation				119.7				119.7
	51 Four-stroke engines	IV	38,114,000 t fuel oil	Gasoline consumption of 4-stroke motorcycles was 3.43 million tons, for which emission factors for Category 3 in the Toolkit were adopted. The annual gasoline consumption of motorcycles was 3.43 million tons, for which emission factors for Category 2 were adopted.	0.34				0.34
	52 Two-stroke engines	IV	380,000 t fuel oil	Gasoline consumption of 2-stroke motorcycles was 380,000 t, for which emission factors for Category 2 in the Toolkit were adopted.	0.93				0.93
	53 Diesel engines	IV	17,096,000 t fuel oil	Used for heavy trucks, light trucks, passenger cars, large-sized building equipment, boats, diesel generators, pumps and agricultural machines, for which emission factors in the Toolkit were adopted.	1.7				1.7
	54 Heavy oil fired engines	IV	29,170,000 t fuel oil	Used for ships, tanks, stationary generators, and other large-sized, semi-stationary engines, for which emission factors in the Toolkit were adopted.	116.7				116.7
6	Uncontrolled combustion processes				64			953 (Soil)	1,017
	61 Forest fires	IV	3,271,474 t forest tree affected	13,466 forest fires across the country which affected 142,238 hectares of forests. Emission factors in the Toolkit were adopted.	16.4			13.1	29.5
	62 Grassland fires	IV	20,450 t forage grass burned	469 grassland fires which burned 20.45 million kilograms. Emission factors in the Toolkit were adopted.	0.31			0.25	0.56

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
	63 Stalk open burning	IV	94,000,000 t	Emission factors in the Toolkit were adopted.	47			940	987
	64 Open burning of wastes and accidental fires		Unquantifiable	Lack of relevant data in the Toolkit					0
7	Production and use of chemicals and consumer goods				0.68	23.16	174.39	68.90	267.13
	71 Pulp and paper mills	II	44,550,000 t	Over 3,000 papermaking enterprises, including 89 enterprises with annual output over 100,000 t and about over 100 enterprises using chlorine gas for bleaching. 44,550,000 t paper pulp was consumed in 2004 in China, including 5,000,000 t sulfate pulp bleached with chlorine gas, 6,300,000 t semi-chemical pulp, 50,000 t TCF pulp, 1,400,000 t ECF pulp, 1,130,000 t sulphite pulp (Cl2), 330,000 t mechanical pulp, 23,050,000 t secondary waste paper, 7,317,900 t imported pulp; and 5,000,000 t black liquor from papermaking boilers. Emission factors in the Toolkit were adopted by giving consideration to demonstration projects.	0.36	22.6	115	22.8	161
	72 Na-PCP production	I	2,000 t	Only 1 enterprise, for which emission factors were determined based on testing.			25		25
	73 PCBs production		0	PCBs production has been stopped since 1974.					0
	73 Production of chlorinated phenols and their derivatives	I	16,800 t	15 enterprises, which produced 800 t 2, 4, 6-trichlorophenol and approximately 16,000 t 2,4-D. There was no production in China of the pesticides listed in the Toolkit such as ronnel, erbon, fenoprop, zytron, sesone, 2,4,-dichlorophenoxybutyric acid, 2,4,6-trichlorophenol, or 2,4,5-T. Emission factors were determined based on testing.			11.8		11.8
	74 Tetrachlorobenzene production	I	1,700 t	3 enterprises, for which emission factors were determined based on testing.			17.9		17.9
	75 Production of 2,4,6-Trichlorophenyl-4'-nitrophenyl ether (CNP)		0	No data to show that China ever produced CNP.					0

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
76	Chlorobenzene production	IV	34,000 t	Over 20 enterprises, which produced 6,000 t dichlorobenzene, 22,000 t o-dichlorobenzene and 6,000 t 1, 2, 4-trichlorobenzene. Emission factors in the Toolkit were adopted.			0.23	18	18.23
77	Chloralkali production	IV	20,000 t	Several small plants, for which emission factors in the Toolkit were adopted.				20	20
78	PVC production	IV	5,330,000 t PVC	PVC production capacity by processes: 15% by ethylene process, 14% by imported EDC, 15% by imported VCM, and 56% by calcium carbide process. Emission factors in the Toolkit were adopted.	0.32	0.56	0.56	8.1	9.54
79	Chlorinated aliphatic chemicals production	IV		Lack of relevant data in the Toolkit.					0
710	Chlorinated inorganic chemicals	IV	15,000 t	1 production enterprise with annual capacity of 15,000 t, which adopts titanium dioxide chlorination technology.					0
711	Petroleum refineries	IV	174,502,900 t crude oil	Crude oil output: 174,502,900 tons; gasoline output: 52,497,700 tons; kerosene output: 9,707,500 tons; diesel fuel output 101,620,800 tons.					0
712	Textile plants	IV	Raw materials: 39,300,000 t	Chemical fiber: 14,245,400 tons; viscose fiber: 966,100 tons; synthetic fiber: 13,139,600 tons; cotton yarn: 10,948,000 tons. Emission factors in the Toolkit were adopted.			3.9		3.9
713	Leather plants	IV	100 million pieces						0
8	Miscellaneous				44.2			11	55.2
81	Drying of biomass		0	Releases of Dioxin from this sector can be ignored at the present stage.					0
82	Crematoria	II	4,369,000 corpses	There were 3,119 funeral and interment institutions, including 1,549 funeral chapels, 633 funeral and interment governing institutions and 4,792 cremating machines, for which emission factors for Category 2 were adopted.	44			10.9	54.9
83	Smoked food			No data, as there were still no statistics on annual output of smoked food.					0

No.	Release source and category	Emission factor determining method*	Total amount in 2004	Scale and calculation basis	Release (g TEQ/a)				
					Air	Water	Products	Residues	Total amount
	84 Dry cleaning residues	IV	2,600 t Residues	There were 130,000 dry cleaners, for which emission factors in the Toolkit were adopted.				0.13	0.13
	85 Tobacco smoking	IV	1,877,860 million cigarettes	There are many cigarette enterprises producing 1,877.86 billion cigarettes annually, and 4 cigar enterprises producing 200 million cigars annually, for which emission factors in the Toolkit were taken.	0.19				0.19
9	Disposal/landfill					4.53		43.2	47.7
	91 Waste landfill and stockpile	IV	Municipal solid waste landfill: 110,300,000 t; Hazardous waste landfill: 142,000 t.	Emission factors in the Toolkit were adopted.		0.33			0.33
	92 Sewage/sewage treatment	I	8,440,000,000 t	Emission factors were determined based on actual testing.		4.2		6.8	11
	93 Open water dumping	IV	17,690,000,000 t	Emission factors in the Toolkit were adopted.				3.5	3.5
	94 Composting	IV	4,390,000 t	Emission factors in the Toolkit were adopted.				32.9	32.9
	95 Waste oil disposal			No data					0
1-9	Total				5,042.4	41.2	174.4	4,978.7	10,236.8

*Note: I – Actual testing; II – Combination of testing data and Toolkit; III – References; IV – Adoption of emission factors in the Toolkit.

** “Municipal solid waste incineration” includes incineration of municipal solid waste and aeronautic waste generated in cities and towns at county level and below.

In 2004, the total releases of Dioxin from all types of sources in China was 10.2 kg toxic equivalent (TEQ), 5.0 kg TEQ of which was released to air, 0.04 kg TEQ to water, 0.17 kg TEQ in products and 5.0 kg TEQ in residues. Dioxin releases in iron and steel and other metal production industry were the biggest, accounting for 45.6% of the total, followed by power and heat generation and waste incineration. Releases from these three types of sources accounted for 81% of the total releases. The industrial distribution of Dioxin releases in China is shown In Figures 2-11 to 2-13. The regional distribution of a portion of Dioxin release sources in China is shown in Figure 2-14, from which it can be seen that east China has the largest releases, followed by the southern part of central China, then north, southwest, northeast and northwest China, successively.

With regulation by the state of the industrial structure and technical advancement of enterprises in the “Five-Year Plan” period: mass production will become the direction of development of enterprises; outdated processes will be phased out gradually; some small enterprises will be closed, suspended, merged or shifted to other sectors; and technical advancement will contribute to reduction in Dioxin release in these industries. In the period, on the other hand, the total quantity of industrial products of key industries will increase on a continuing basis, which will lead to an increase in total releases of Dioxin. However, as a result of combined influence of the above-mentioned two factors, Dioxin releases in the future 5 years will still increase over 2004.

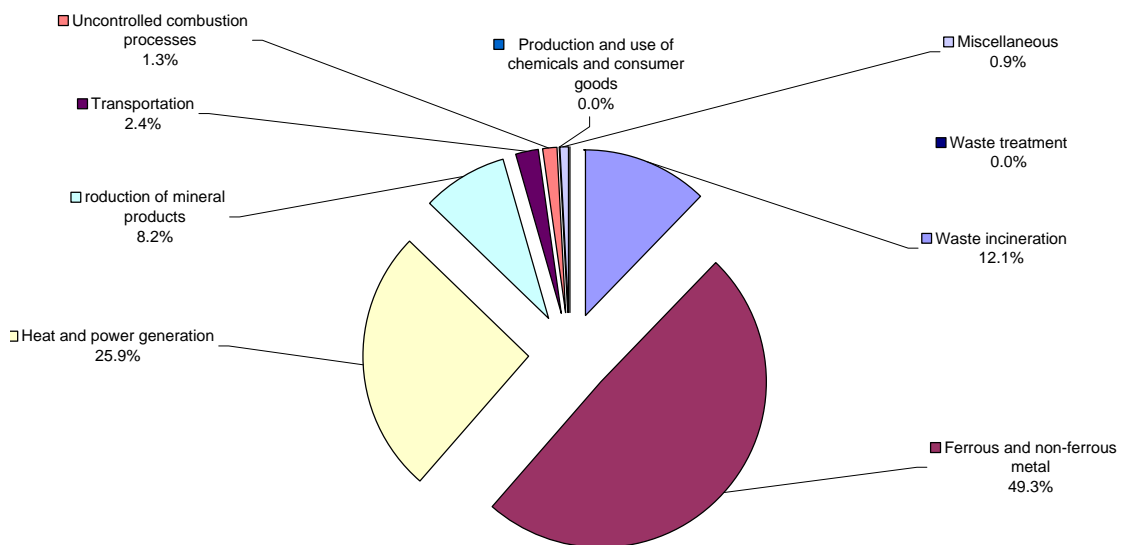


Fig. 2-11 Distribution of dioxin releases to air by industries in China

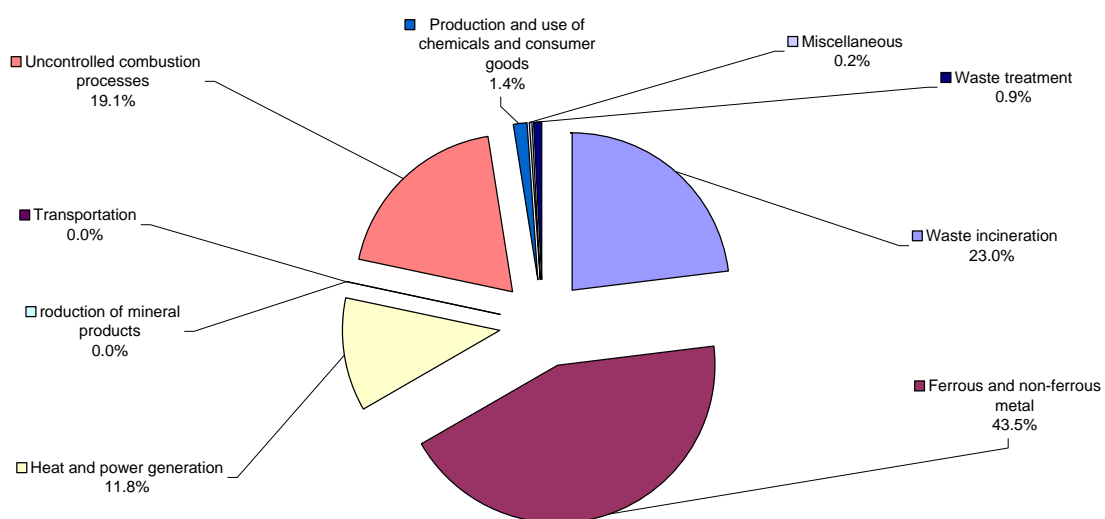


Fig. 2-12 Distribution of dioxin releases in residues by industries in China

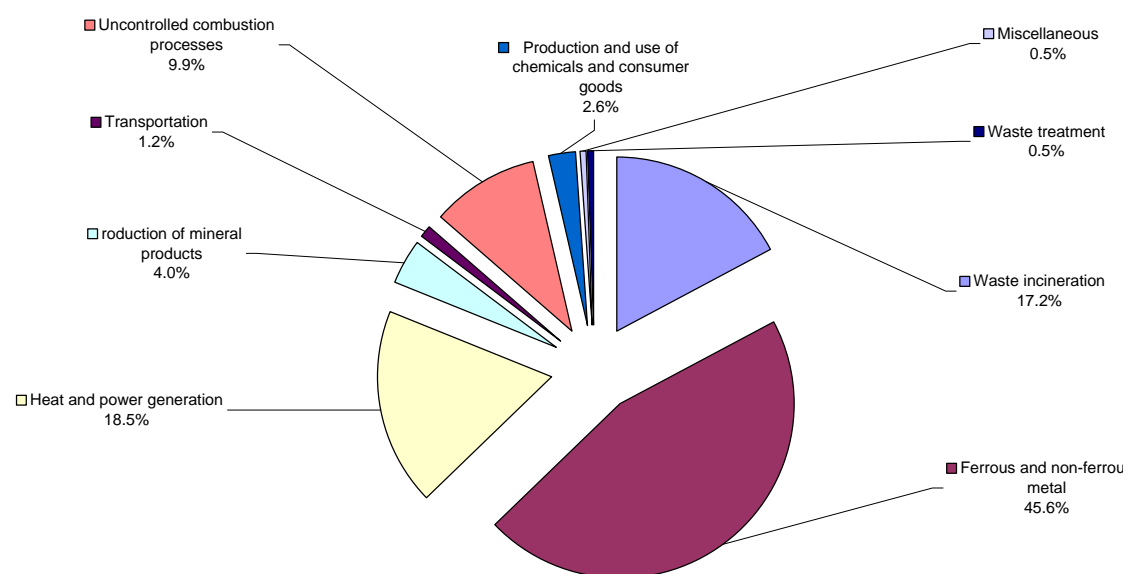


Fig. 2-13 Distribution of dioxin releases by industries in China

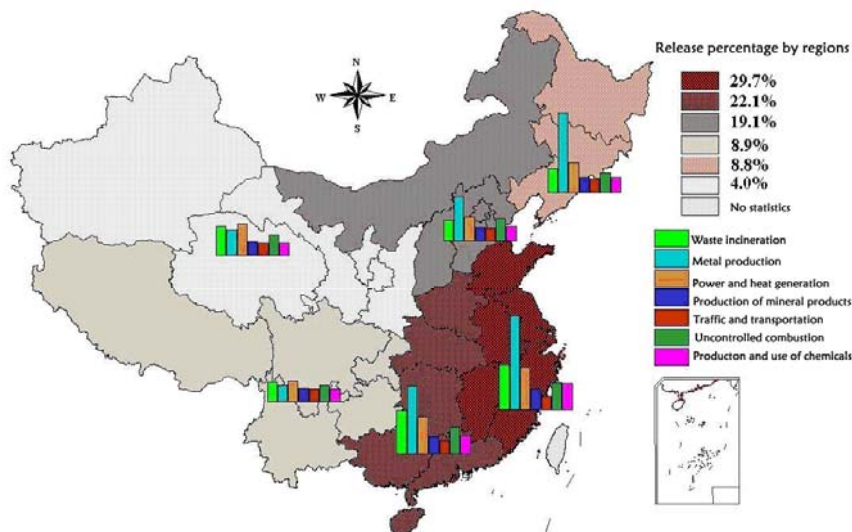


Fig. 2-14 Distribution of six major regions with part of Dioxin-like release sources in China

Based on the characteristics and releases of different industries, key Dioxin release sources to which China should give priority can be further specified in accordance with the following principles: (1) sources required by the Convention to be controlled (the sources listed in Annex C of the Convention); (2) sources with comparatively high releases; (3) sources with a comparatively large upward tendency; (4) sources for which BAT/BEP guidelines recommended by UNEP can be applied; (5) sources for which there are sophisticated release reduction technologies and successful practical experience at home and abroad; and (6) sources to which the state specifies giving priority. The key industries over which China gives priority to the control (“key industries”) and their releases are shown in Table 2-17. The total release of the key industries is 6,332 g TEQ, accounting for 61.9% of the total of the country.

Table 2-17 Key industries to which China gives priority for control

Key Industries	Whether the release sources comply with Part II of Annex C	Release Distribution		Whether there is any growth tendency	Whether there is any BAT/BEP directive	Whether there is any higher risk
		Atmosphere	Total			
(1) Wastes incineration industry		610.5	1757.6			

Domestic garbage incineration	Yes	125.8	338.0	Yes	Yes	Yes
Hazardous Wastes incineration	Yes	57.3	243.3	Yes	Yes	Yes
Medical treatment wastes incineration	Yes	427.4	1176.3	Yes	Yes	Yes
[Waste] Water treatment and burning sewage sludge	Yes	0.0	0.0	Uncertain	Yes	No
Cement kiln hazardous waste incineration	Yes	0.015	0.62	Yes	Yes	No
(2) Paper-making industry (chlorine bleach)	Yes	0.35	161	Uncertain	Yes	Yes
(3) Iron and Steel Industry		1673.4	2648.8			
Iron ore agglomeration	Yes	1522.5	1523.4	Uncertain	Yes	Yes
Steelmaking in electric arc furnace	No	150.9	1125.4	Yes	Yes	Yes
(4) secondary nonferrous metal industry		544.5	1607.3			
Secondary copper	Yes	403	1133.8	Yes	Yes	Yes
Secondary aluminum	Yes	133.5	465.5	Yes	Yes	Yes
Secondary zinc	Yes	8	8	Yes	Yes	No
(5) Crematoria	No	44	54.9	Yes	Yes	No
(6) Chemical industry		0	102.4			
Santobrite production	No	0	25	No	Yes	No
Chlorophenol derivative production	No	0	11.8	No	Yes	No
Chloranil production	No	0	17.9	No	Yes	No
Chlorobenzene production	No	0	18.2	No	Yes	No
Chlor-alkali production	No	0	20	No	Yes	No
PVC production	No	0	9.54	Yes	Yes	No
Total of the release sources of the key industries		2,872.8	6332			
Total Releases in 2004		5042.4	10236.8			
Distribution of Releases		57.0%	61.9%			

Considering that the present inventory of Dioxin release sources and the release estimates were made mainly pursuant to the *Standardized Toolkit for Identification and Quantification of Dioxin Releases* and by combining a small quantity of monitoring data, a complete inventory of Dioxin releases in China still needs to be further verified and particularized through carrying out monitoring, analysis and research on emission factors.

China has no monitoring data available on unintentionally produced PCBs and HCB, and very little research was ever conducted on their sources and releases. Because the Secretariat of the Convention has not provided methods for estimation of these POPs, releases of unintentionally produced PCBs and HCB are not clear.

II. Existing policies, laws and regulations

The *Environmental Impact Assessment Law* issued in October 2002 stipulates that environmental impact assessment shall be carried out for construction projects which should have classified management. The *Catalogue on Classified Management of Construction Projects for Environmental Protection* issued in July 2002 stipulates that environmental impact reports shall be compiled for construction projects whose raw materials, products or production processes are concerned with pollutants with severe toxicity and difficulty to degrade in the environment, to make a complete assessment of the environmental impacts induced. Relevant provisions in the *Technical Guideline on Environmental Impact Assessment* encourage enterprises to carry out technical renovation, eliminate outdated techniques and products, and adopt low emission technologies, which is good for achieving the target of Dioxin release control.

The *Cleaner Production Promotion Law* issued in June 2002 stipulates that enterprises shall monitor waste generation situations and carry out a clean production examination when it is necessary. The *Provisional Measure on Clean Production Examination* issued in August 2004 stipulates that enterprises using toxic and harmful raw materials or having poisonous substances emitted in production shall carry out compulsory a clean production examination. These provisions have created a beneficial condition for promotion of BAT/BEP in key sectors such as wastes incineration, electrical power, steel, non-ferrous metal, cement and chemical industry.

In December 2005, the State Council issued the *Interim Provision on Promotion of Industrial Structural Adjustment*, and the National Development and Reform Commission issued the *Guiding Catalogue of Industrial Structure Regulation (2005)* based on the Provision, which contains articles concerning Dioxin release control.

Table 2-18 Relevant Technical Requirements in the
Guiding Catalogue of Industrial Structure Regulation (2005)

Items	Class	Impacts on dioxin control
Development and application of technologies to reduce and control Dioxin releases	Class I: encouragement	Directly targeting reduction and control of Dioxin release
Construction of medical waste disposal centers, hazardous waste disposal centers, regional worn-out cars disposal centers	Class I: encouragement	Good for unintentionally produced POPs
Agglomerating machine projects below 180 square meters; Electric furnace projects that cannot comply with standards in terms of energy and water	Class II: restriction	Release of unintentionally produced POPs will decrease after restriction

consumption below 70 tons or above 70 tons but not synchronized equipped with soot retrieving equipment;
 Secondary aluminum reverberatory furnace projects below 4 tons

Heap coking (including improved coke ovens);
 Coke ovens with the height of the carbonization chambers less than 4.3 meters (except for the stamp-charging coke ovens of 3.2 meters or above);
 Clay-fired agglomeration, cast iron sintering ore, agglomerating machines below 30 square meters, electric ore-smelting furnaces below 3200 kilovolt amperes;
 Semi-closed direct current deoxidizing furnace below 3000 kilovolt amperes;
 Refining furnaces below 3000 kilovolt amperes;
 The technologies of smelting secondary aluminum alloy and secondary lead in crucible furnaces; and
 Chemical pulp and paper-making production lines below 17 thousand tons per year.

Class III:
 elimination.
 Some have clear
 elimination time
 limits

Release of
 unintentionally produced
 POPs will decrease after
 elimination

Currently, China only has 4 standards concerned with control of pollution caused by unintentionally produced POPs, which are the *Standard on Control of Pollution Caused by Hazardous Wastes Incineration* (GB18484-2001), the *Standard on Control of Pollution Caused by Domestic Wastes Incineration* (GB18485-2001), the *Standard on Air Pollutants Emission of the Cement Industry* (GB4915-2004) and the *Standard on Pollutants Discharge of Urban Sewage Plants* (GB18918-2002). The *Standard on Water Pollutants Discharge of the Paper Making Industry* (GB3544-2001) does not list POPs in it, and only stipulates a control standard of absorptive organic halide that can act as a reference indicator for POPs. Meanwhile, in key sectors concerned with the release of unintentionally produced POPs, such as steel and recycled metal, there is no relevant control standard.

The *National Catalogue on Hazardous Wastes* issued in 1998 classifies wastes containing polychlorinated dibenzofurans (PCDFs) and wastes containing polychlorinated dibenzo-p-dioxins (PCDDs) into Classes HW43 and HW44, respectively. In addition, Dioxins are listed in the *Catalogue on Chemicals with Severe Toxicity (2002)* and the *Regulations on Safety Management of Hazardous Chemicals* are followed for their production, use, transportation, import and export.

The *Technical Policy on Hazardous Wastes Pollution Prevention and Control* lays out concrete technical requirements on incineration facilities for hazardous wastes based on the principle of reducing hazardous wastes, and making them a recyclable resource and harmless. The *Regulation on Medical Wastes Management* stipulates that medical wastes shall be burned, in time, as long as it is possible, and the centralized disposal of medical wastes shall comply with national standards and regulations on environmental protection and sanitation. For wastes incineration, China has promulgated the following technical regulations: the *Technical Regulations on Centralized disposal of Medical Wastes*, the *Technical Regulation on Centralized Incineration Projects of Hazardous Wastes* (HJ/T177-2005), the *Technical Regulation on Centralized Incineration Projects Construction of*

Hazardous Wastes (HJ/T176-2005), and the Technical Regulation on Environmental Protection of Zones for Centralized Dismantlement, Utilization and Disposal of Abandoned Machinery Products (Trial version) (HJ/T181-2005).

For those which are not waste incineration sectors, such as steel, paper making and recycled metal, there is no related technical regulation on release control for unintentionally produced POPs

According to convention implementation requirements, China is yet to establish and perfect an inventory on Dioxins release. Concrete control measures addressing Dioxins coming from sources listed in Part II of Annex C cannot fully meet the BAT/BEP requirements and there is no concrete technical regulation or standard addressing control of most of the Dioxin sources listed in Annex C. Currently, China does not have an environmental quality standard addressing Dioxins.

III. Dioxins control technologies

China is very weak in research, replication and application of Dioxins release reduction and control technologies. Only a small number of enterprises own the world leading production techniques and have adopted some BAT/BEP technologies that are good for Dioxins release reduction and control. Most enterprises (especially the majority of small and medium size enterprises) lag behind in technical levels, and their pollution control facilities are not available or sufficient to play a proper role.

Although China has made technical requirements for Dioxins control in incineration of domestic wastes, hazardous wastes and medical wastes, there is still a gap compared with requirements set out in the BAT/BEP Guidelines of the convention.

The non-chlorine bleaching technique has been applied in the paper-making industry, but currently there are few enterprises fully using this technique. Concerning the bleaching technique with chlorine, several enterprises have carried out research on process optimization for Dioxins release reduction.

China has put the outdated ironstone sinter and electric arc furnace steel-making techniques on the elimination list. However, the steel industry has low awareness of the Dioxin issue and Dioxin control techniques are far behind the BAT/BEP requirements in the convention. In particular, a great number of medium, small and old steel enterprises lag behind in techniques, while only few enterprises have techniques reaching the world leading level. Dioxins control is very difficult. Moreover, in order to control Dioxins release, enterprises have great investment needs, which have become a crucial restriction factor.

In the metal recycling industry, Dioxins may be released in the production, dismantlement, smelting and incineration processes, but fume generated is released directly without treatment. Especially in the smelting process, smelting facilities are obsolete and paint removal procedures are lacking, which will result in high Dioxin releases. At present, the Chinese government has realized the problem and carried out relevant investigations and research.

The situations of Dioxin release control technologies for the aforementioned key sectors are summarized in Table 2-19.

Table 2-19 Situations of Dioxin release control technologies
for relevant key release sources in China

Key industries	Applied BAT/BEP or not	In the stage of R&D	Attention and research
(1) Wastes incineration			
Domestic wastes incineration	Little application	Development and application	
Hazardous wastes incineration	Little application	Development and application	
Medical wastes incineration	Little application	Development and application	
Sludge incineration	Little application	Preliminary stage	
Cement kiln burning hazardous wastes	Little application	Development and application	
(2) Paper making (bleaching with chlorine)	Little application	Preliminary stage	
(3) Steel			
Ironstone sinter	Little application	Preliminary stage	
Steel making in electric arc furnace	Little application	Preliminary stage	
(4) Regenerated non-ferrous metal			
Regenerated copper	No		No
Regenerated aluminum	No		No
Regenerated zinc	No		No
Regenerated lead	No		No
(5) Funeral and interment (cremation machine)	No	Development and application	
(6) Chemical industry			
Production of Na-PCP	Little application		
Chlorophenol derivatives production	No		Attention
Chloranil production	Little application		
Chlorobenzene production	No		Attention
Chlor-alkali	Little application		
PVC production	No		Attention

Generally speaking, due to the differences among release enterprises in scale, technology, management, pollution control facility and environmental protection awareness, and the great differences among different regions in technological and economic levels, BAT/BEP implementation is facing huge challenges.

IV. Research data

Except that the *Action Plan on Foods Safety* issued in 2003 lists Dioxin capacity in the monitoring plan, and a few research monitoring activities have been carried out on animal foods on this basis, China has not established systematic monitoring of Dioxins in environmental media, health indicators or foods. With little research data, it is very difficult to completely reflect and evaluate the environmental and health risks caused by Dioxins pollution. Some of the research outcomes are listed in Table 2-20.

Table 2-20 Sample data on Dioxin concentrations in research reports of some regions

Region	Sample	Dioxin concentration	Monitoring method	Sample situation	Monitoring Time	Reference literature
Schistoso-miasis occurring region	Human blood sample	9.0 - 16.3 pg-ITEQ/g, lipid	HRGC/MS	Blood sample of 50 residents in the exposure region	1994	[25]
Non-disease occurring region	Human blood sample	4.8 - 6.4 pg-ITEQ/g, lipid	HRGC/MS	Blood sample of 50 residents in the non-disease occurring region	1994	[25]
Schistoso-miasis occurring region	Human milk	5.4 pg-ITEQ/g, lipid	HRGC/LRMS (EI、NCI/NH4)	Milk sample of 50 mothers in the exposure region	1994	[25]
Non-disease occurring region	Human milk	2.6 pg-ITEQ/g, lipid	HRGC/LRMS (EI、NCI/NH4)	Milk sample of 50 mothers in the non-disease occurring region	1994	[25]
Dalian	Human milk	15.84 pg TEQ/g, fat	CALUX method	47 human milk samples	2002	[26]
Shenyang	Human milk	7.21 pg TEQ/g, fat	CALUX method	32 human milk samples	2002	[26]
Sediment in schistoso-miasis occurring region	Sediment	128.3 - 890.5 pg TEQ/g, dry weight	GC-MS	8 sample sites	1995	[25]
Zhujiang River Delta	Sediment	0.6-17.5 I-TEQ pg/g, dry weight	GC-MS	8 sample sites	2001	[26]

2.3.5 Stockpiles, Wastes and Contaminated Sites

POPs stockpiles refer to POPs products listed in Annexes A and B of the Stockholm Convention and stored for long periods by producers, sales sites and users, which basically have no market value and are not in condition for distribution and use, but have not yet been defined as wastes.

POPs wastes refer to products or substances composed of, containing or contaminated by POPs, which have already lost their original value, been discarded or abandoned, and have POPs content above a certain standard.

POPs contaminated sites refers to sites which are polluted by POPs and with POPs content above a certain standard.

I. POPs Stockpiles, Wastes and Contaminated Sites

POPs STOCKPILES

Present surveys reveal that there exists a small quantity of pesticide POPs stockpiles in very few units that originally produced or used pesticide POPs. Once discovered, these stockpiles will be validated as POPs wastes and included in survey statistics of POPs wastes. The detailed status of POPs stockpiles in China needs to be further investigated.

POPs WASTE CONTAINING PESTICIDES

In the area of production, there are a total of 58 units involved in production of pesticide POPs, including 14 existing units. Through preliminary screening, there are 44 enterprises in total which need to be investigated on site²². Additionally, 22 enterprises have been identified, including all existing production enterprises as well as enterprises with larger historical volumes of production.

The status of pesticide POPs wastes identified through preliminary investigation of the areas of POPs production and circulation is shown in Figure 2-15. Because the production and use of toxaphene and heptachlor was completely stopped in the 1970's, and large-scale production of dieldrin, endrin and aldrin has never been started, their chemical wastes have not been found in China. At present, identified pesticide POPs wastes are mainly DDT, chlordane, mirex and HCB: for the latter, production was stopped in 2004. The POPs wastes status based on surveys and analyses is shown in Table 2-21 and Figure 2-15.

Table 2-21 **Known Pesticide POPs Wastes**

Area	DDT	Chlordane and Mirex	HCB	Toxaphene	Total
-------------	------------	--------------------------------	------------	------------------	--------------

²² Of the other 14 enterprises, 8 are scientific research units, 3 have been developed for other purposes and 3 have been closed.

Production	Number of enterprises	13	21	6	16	55 ²³
	Number of surveyed enterprises	9	9	2	2	22
	Estimated waste quantity (ton)	2400-2800	1380-1510	60-70	-	3840-4380
Circulation	Estimated waste quantity in agricultural area (ton)	164-1640	-	-	-	164-1640
	Estimated waste quantity in public health area (ton)	55-73	-	-	-	55-73
	Estimated waste quantity in construction area (ton)	-	-	-	-	-
	Total waste (ton)	2619-4513	1380-1510	60-70	-	4059-6093

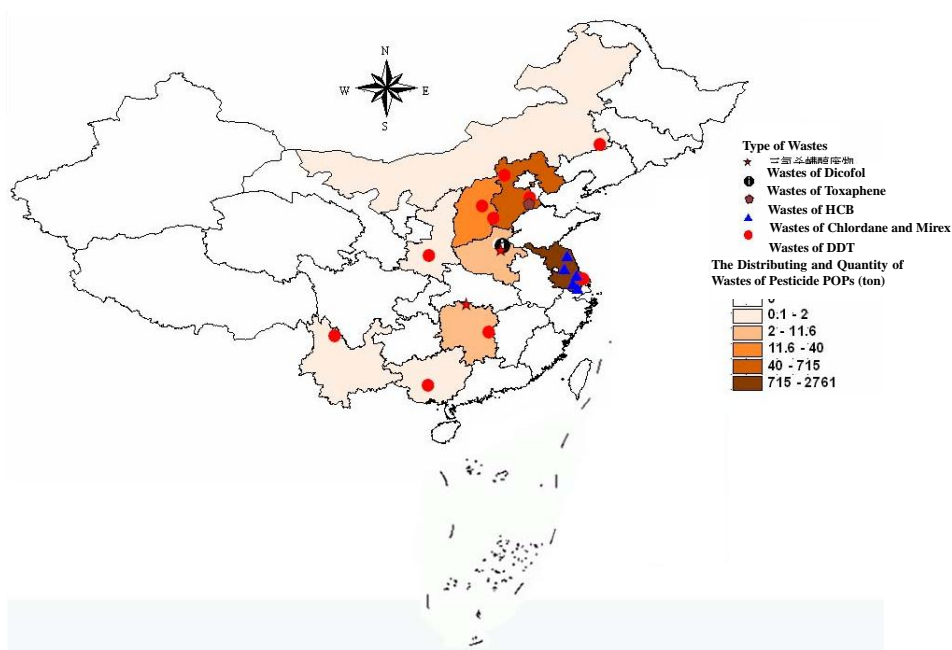


Fig. 2-15 Geographical Distribution of Pesticide POPs Wastes for which the Location and Quantity Has Been Confirmed

Based on the sampling and analysis of a proportion of sites, the total quantity of pesticide POPs wastes in China is estimated to be 4,000 to 6,000 tons, with DDT being 2,600-4,500 tons and HCB, chlordane and mirex being 1,500 tons in total.

Pesticide POPs wastes in the production area for which the locations and quantities

²³ One of the enterprises produces both DDT and HCB.

have already been confirmed are 2,228-2,458 tons. Confirmed DDT waste in the agricultural area is 14 tons. In the public health area, the confirmed DDT waste is 11 tons.

Pesticide POPs wastes in China are mainly located in Jiangsu, Hunan, Sichuan, Shandong, Tianjin, Shanxi, Hebei and Liaoning, accounting for 70-80 % of the total waste quantity.

At present, the storage methods of the above wastes are chiefly outdoor storage and simple enclosure.

WASTES CONTAINING PCBs

According to the *Regulation of the Prevention of Electrical Equipments Containing PCBs* and their wastes from *Environmental Pollution and Control Standard on PCBs for Wastes*, PCBs wastes can be divided into toxic PCBs wastes (≥ 50 ppm) and common PCBs wastes (< 50 ppm). Toxic PCBs wastes higher than 500 ppm (called high-density PCBs wastes in this report) must be processed with high-temperature incineration; PCBs wastes of 50-500 ppm (called low-density PCBs wastes in this report) are allowed to be processed with safe disposal and high-temperature incineration.

In the 1980s, China began to seal or temporarily seal electrical equipment containing PCBs and their wastes. A few regions and units have burned or disposed of their electrical equipment containing PCBs and their wastes. Since the early 1990s, when the *Regulation of the Prevention of Electrical Equipment Containing PCBs* and their wastes from the *Environmental Pollution and Control Standard on PCBs for Wastes* was promulgated, China began to seal electrical equipment containing PCBs and their wastes in a standard and centralized manner, mainly in caves and underground. Some of them are sealed in idle warehouses or open ground, with phenomena of PCBs directly entering the environment.

Because of improper management, most information on sealing of electrical equipment containing PCBs and their wastes has been lost. Electrical equipment containing PCBs and their wastes sealed in a centralized manner have exceeded their 20-year design life. Because of insufficient consideration of leakage to water, such leakage has occurred to various extents. Some underground sealing sites are covered by roads or constructions. Almost all temporary storage sites have exceeded their 3-year term of temporary sealing, and some that area stored in a non-standard way or casually land-filled pose potential risks to the ambient environment and residents.

Based on the PCBs survey results of two provinces, the total amount of high-density PCBs wastes in China is estimated to be approximately 50,000 tons (including crushed waste capacitors), and the total amount of low-density wastes estimated to be 500,000 tons.

In Zhejiang Province, there are 43 sealed sites of electrical equipment containing PCBs that have been confirmed, including: 5 sites that have been safely cleared; 10 sites that have not been completely cleared; and 28 sites which have not yet been

cleared. Figure 2-16 shows the distribution of PCBs sealed sites in Zhejiang Province.

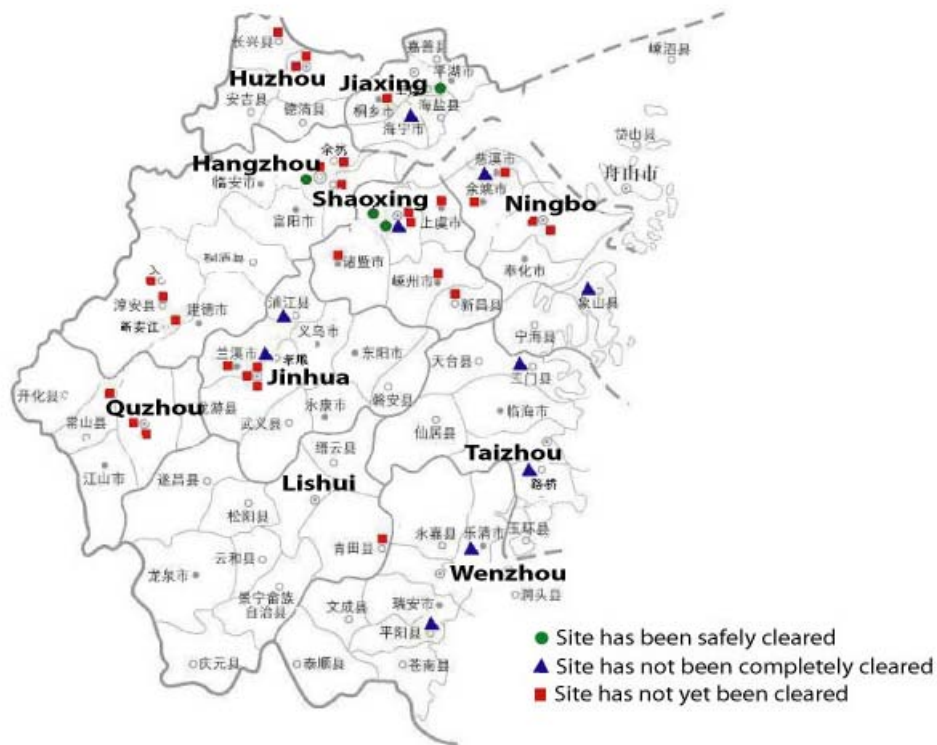


Fig. 2-16 Status and Distribution of PCBs Pollutants Sealed Up in Zhejiang Province

In Liaoning Province, there are 40 sealed sites of electrical equipment containing PCBs that have been confirmed, including: 1 site that has been safely cleared; 11 sites that have not completely cleared; and 28 sites which have not yet been cleared. Figure 2-17 shows the distribution of PCBs sealed sites in Liaoning Province.

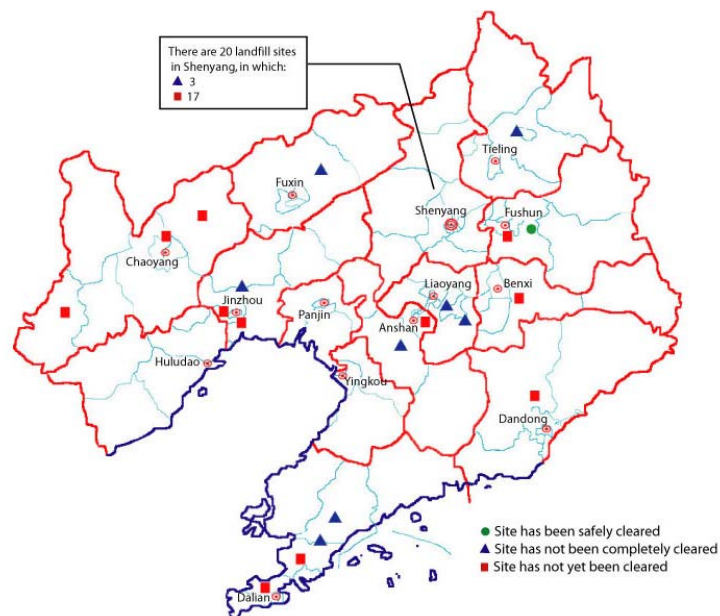


Fig. 2-17 **Status and Distribution of PCBs Pollutants Sealed Up in Liaoning Province**

Since the 1990's, China has begun to implement environmentally sound disposal of hazardous wastes including PCBs wastes with high-temperature incineration, and relevant regulations have been constituted. In Shenyang, PCBs waste disposal facilities have been established, which have disposed of approximately 700 tons of PCBs wastes since 1995.

POPs WASTES CONTAINING DIOXIN

POPs wastes containing Dioxin in China include ash, residue and slurry produced in the process of production. They mainly come from such processes as waste incineration, metal smelting, papermaking, chemical production, electricity and heat production, and outdoor incineration. Based on the Dioxin survey, initially identified POPs wastes containing Dioxin are shown in Table 2-22.

Table 2-22 **Some Sources of POPs Wastes Containing**

Dioxin That Have Initially Been Identified	
Type of Pollution Source	Dioxin Release in Ash and Residue (gram TEQ)
Incineration of waste	1,147.1
Metal smelting	2,167.2
Chemical production and use	68.9
Electricity and heat production	588.1
Outdoor incineration	940
Total	4,911.3

In 2004, the amount of Dioxin released in China to the environment through wastes was 4,978.7 gram TEQ. The total release of Dioxin from waste incineration, metal smelting, chemical production and use, electricity and heat production and outdoor incineration was 4,911.3 gram TEQ.

Ashes from combustion contain Dioxin and heavy metal wastes. According to current regulations, such ashes should be managed as hazardous waste, i.e., they should be treated with safe landfill disposal after stabilization. Because the safe disposal of ashes from combustion is a recent issue, there is not enough research and development in this field and China lacks relevant standards, regulations, technology and equipment. Limited by site, technology and concept, solid waste incineration plants commonly adopt storage or simple landfill disposal of ashes.

CONTAMINATED SITES CONTAINING POPs

Pesticide POPs contaminated sites mainly occur in the area of production, with major types being:

- original production sites;
- storage sites, where toxic and hazardous wastes are centralized after the change of business or closure of an enterprise; and
- storage sites, where wastes are stacked in the process of production. (Most pesticide POPs production enterprises were built in the 1960's and 1970's, featuring simple and crude production equipment, primitive manufacturing techniques and no pollution control facilities.)

Thus, the surrounding environment was severely contaminated by the "three wastes" released in production. After the production of some POPs chemicals was stopped in the 1980's, most manufacturers did not clean up their equipment and sites. The toxic and hazardous wastes cleared up by some manufacturers were simply stacked inside and outside the plants and most storage sites did not have prevention measures, resulting in severe contamination of the surrounding environment. Based on a field survey of pesticide POPs manufacturers, among 44 identified as contaminated, 22 sites have been investigated and sampled. Four out of the 22 sites have been evaluated chemically and physically, and monitoring and analysis results show that two DDT manufacturers have an estimated amount of 90,000 t soil with a contamination level above 50 ppm, and two HCB and chlordane manufacturers have an estimated amount of 20,000 t soil with a contamination level above 50 ppm.

In the distribution area, pesticide POPs contaminated sites are chiefly the warehouses of middle distributors (such as former agricultural trade companies) and manufacturers that produce dicofol and antifouling paints with DDT in non-closed systems. Further investigation needs to be conducted into pesticide POPs contaminated sites.

PCBs contaminated sites mainly include: sealed and temporarily sealed sites for electrical equipment containing PCBs; sites for dismantling PCBs-containing electrical equipment; and production areas for PCBs oils and PCBs-containing electrical equipment. A large number of PCBs contaminated sites are difficult to identify. Until 2004, investigation and identification conducted in Zhejiang and

Liaoning alone (two demonstration provinces), found that 83 sealed sites are basically PCBs contaminated sites.

No survey on Dioxin contaminated sites has yet been conducted in China.

Due to the lack of relevant regulations, existing POPs contaminated sites in China have not yet adopted proper disposal and restoration measures. Some enterprises have been engaged in production for decades, causing severe contamination to local soil and underground water. POPs contaminated sites pose a great threat to the health of people and the safety of the environment.

II. Current Policies and Regulations

The *Law of the People's Republic of China on the Prevention and Control of Environmental Pollution Caused by Solid Waste* is a special law of China regarding waste management, which stipulates the whole process of pollution control over hazardous wastes from production, collection and storage, to transport and disposal. POPs wastes are hazardous wastes which have been listed in the *National List of Hazardous Wastes*. Among them, pesticide POPs are listed in Category 4, PCBs are listed in Category 10, and Dioxin is listed in Category 43 and Category 44.

Policies and regulations applicable to the management of POPs waste and POPs contaminated sites are summarized as follows.

As stipulated in the *Provisions on Administration of Report and Registration of Pollutants Discharge*, the units producing solid wastes shall register and declare relevant information such as the type of solid waste, quantity, density, discharge destination, discharge site, discharge mode, storage of solid wastes, utilization or treatment site, etc.

As stipulated in the *Measures for the Administration of Permit for Operation of Hazardous Wastes*, the units engaged in the business of collection, storage or treatment of hazardous wastes shall obtain a *Permit for Operation of Hazardous Wastes*. Such permits can be classified into two categories, i.e., general permit covering the operation of collection, storage and treatment of hazardous wastes, and the permit covering the operation of hazardous wastes collection. As special hazardous wastes, the permit for operation of PCBs wastes shall be approved and issued by the State Council's administrative department in charge of environmental protection.

As stipulated in the *Measures on the Management of Duplicated Form for Transfer of Hazardous Wastes*, transfer of hazardous wastes within China adopts a duplicated-form system under the supervision and management of the State Environmental Protection Administration. Any unit producing hazardous wastes shall submit its hazardous wastes transfer plan for approval in accordance with the stipulations prior to the transfer of the hazardous wastes. After receiving the approval, the unit shall apply for the duplicated form from the competent administration department in charge of the region from which the hazardous wastes are intended to be transferred. Transfer of hazardous wastes shall be strictly accompanied by the transfer and handover record, and the duplicated form is to be kept for 5 years.

According to the stipulations in the *Measures for the Prevention and Control of Environment Pollution by Discarded Hazardous Chemicals*, in the case that pollution is caused to some site, an environmental remediation plan shall be submitted to the environmental protection department above county level for approval, and cleanup of the polluted site shall be conducted within the time limit specified by the environment protection department. When the polluted site is cleaned, the unit shall entrust an environmental protection testing body to conduct tests on the site after remediation, and then the testing report shall be submitted to the environmental protection department above county level for filing.

Specific requirements are put forward in the *Principles for the Environmental Impact Assessment Technology on Hazardous Waste Treatment Facility Construction Project* in regards to selection of location, treatment technologies, treatment modes, environmental impacts, environment protection measures, public opinions, etc.

The *Guidance for Identifying Solid Wastes (Trial)* covers the methods and procedures for identifying solid wastes and is applied to determine solid wastes containing POPs. Standards for solid wastes or hazardous wastes testing and analysis methods include: the test method for identifying the harmful characteristics of solid wastes, e.g., *Causticity Test – Glass Electrode Method, Solid Wastes* (GB/T15555.12-1995), *Testing Method for Leaching Toxicity of Solid Wastes* (GB/T15555.1-15555.11); and the *Standard on Identification of Hazardous Wastes* includes methods for analysis of POPs, for instance, the analysis methods for polychlorinated biphenyls and Dioxins are established.

The *Hazardous wastes - pollution control standards* – including *Hazardous Wastes - Pollution Control Standards for Incineration* (GB18484-2001), *Standard for Control of the Security Landfill Site for Hazardous Wastes* (GB18598-2001) and *Standard for Pollution Control of Hazardous Waste Storage* (GB18597-2001) – stipulate specific technical details or principles for incineration, landfill and storage of hazardous wastes.

The *National Program of Disposal Facilities Construction for Hazardous Wastes and Medical Wastes Treatment* was approved in 2004. Thirty-one synthetic hazardous treatment centers will be constructed in China and the newly added hazardous wastes treatment capacity will reach 2.82 million tons/year. Enterprises will expand the general utilization, treatment and disposal capacity to 3.50 million tons/year. Total hazardous wastes produced in the same year will be disposed of and the hazardous wastes stockpiled during the past years will be gradually handled.

Furthermore, China has also stipulated special administrative regulations and standards with regard to PCBs. The *Notice on the Issues Concerning Prevention of Pollution Caused by Hazardous Polychlorinated Biphenyls* was promulgated in 1979 to ban future imports of power equipment containing PCBs. The *Notice on Enhancement of the Management over Waste Polychlorinated Biphenyl Power Capacitors* was issued in 1990 to forbid trading and dismantling downstream capacitors containing PCBs.

In the *Provisions on the Pollution Caused by Power Installations Containing*

Polychlorinated Biphenyls and Related Wastes that was decided in 1991, requirements on the declaration, transfer, transport, import, treatment, disposal, sealing-up and storage of polychlorinated biphenyls for wastes, etc., are put forward. The *Control Standard on Polychlorinated Biphenyls for Wastes* (GB13015-91) was implemented in 1991, in which the value of the control standard on PCBs wastes and the treatment methods for wastes containing PCBs are stipulated.

III. POPs Wastes and Contaminated Sites Treatment and Remediation Technology

At present, POPs disposal technologies in China mainly include safe landfill, high-temperature incineration and cement kiln treatment, but these cannot meet the requirements of BAT/BEP Directives of the Convention. Though some research has been conducted in the application of photocatalysis oxidation, pyrolysis and new ion liquid extraction technologies, there is a great gap compared to foreign mature technologies.

China lags behind other countries regarding the study of remediation technologies for contaminated sites, suffers a weak foundation and is not able to satisfy the requirements for treatment and remediation of contaminated sites. In the last 10 years, China has been carrying out research on the recovery of electrodynamic remediation technology and biological repair, etc., and is in the early laboratory research and development stage. As a result, the opportunity for large-scale engineering application is still immature.

2.3.6 Control of POPs production and use for exemptions and for acceptable purposes

China has listed HCB, chlordane, mirex and DDT in the *Guiding Catalogue of Industrial Structure Regulation (2005 Edition)*, stipulating that they shall be phased out pursuant to Convention implementation plans. Enterprises voluntarily stopped HCB production in 2004 and China is now further defining the time limit for phasing it out. The *China Demonstration Project on Dicofol Alternatives Used for Mite Plague Control* was initiated in December 2005 and efforts have been made to phase out the production and use of DDT beyond the emergency prevention purpose for disease vectors. In July 2006, the *China Demonstration Project on Chlordane and Mirex Alternatives Used for Termite Prevention* was initiated to take actions for eliminating the production and use of chlordane and mirex.

2.3.7 Existing programmes for POPs release monitoring, environmental and human health impacts

At present, except that the *Trustworthy Food and Drug Project* of the State Council and the *Action Plan for Food Safety* of the Ministry of Health have definitely decided to include food pollutants across the country in their plans and to conduct monitoring of such POPs as DDT, PCBs and Dioxin, China has not carried out a nationwide systematic assessment of POPs release monitoring, environmental impacts and impacts on human health. All existing data come from scientific research reports involving a small number of regions, and lacks a systematic nature.

In 1981, China acceded to GEMS (Global Environment Monitoring System) for food, including the monitoring of DDT and HCH. In 1992, in order to implement this participation, China organized the food hygiene monitoring and inspection institutes of 10 provinces, and surveyed the residual concentrations of organochlorine pesticides and heavy metals in representative food products in Heilongjiang, Beijing, Zhejiang and Guangdong. The next year, the Ministry of Health surveyed the residual concentrations of organochlorine pesticides in grains, vegetables, fruits, meat, fish, eggs, fresh milk, vegetable oil and tea in 10 provinces – Beijing, Chongqing, Jilin, Henan, Shaanxi, Zhejiang, Fujian, Guangdong, Hubei and Shandong. During 2000-2001, the Institute of Nutrition and Food Safety of the Chinese Center for Disease Control and Prevention conducted surveys of the pesticide residues in representative food samples of 4 regions in China and calculated the Chinese residents' pesticide intake from food.

During 1999-2001, some research institutes in China established cooperation with their counterparts from Germany, Australia, etc., under the support of the EU, to launch larger-scale monitoring on HCH, DDT, PCBs and other organochlorine materials in the Liaohe and Yangtze Rivers. In 2004, the State Environmental Protection Administration, under support of Canadian Trust Funds of the World Bank and in collaboration with the Ministry of Health, carried out the project "Case Study of POPs Toxicity to Women and Children", during which the impacts of DDT and PCBs on women and children were beginning to be assessed based on the survey of the exposure level of DDT and PCBs in the bodies of women and children of some typical regions in China.

In recent years, under the "National Key Technologies Special Projects", "National Basic Research Program", "Key Technologies R&D Programme" and "National Natural Science Foundation of China", research projects were established relating to transport, transformation and degradation of POPs substances. For example: "Monitoring Technologies for the Trace and Ultra-trace of Key POPs" and "Establishment of Monitoring System for Nationwide Pollutants" under the project Key Technology Research on Food Safety, one of the National Key Technologies Special Projects; "POPs Intake, Their Body Load and Health Effects", a national high technology research project; "Environmental Safety, Evolving Trends and Control Principles of Persistent Organic Pollutants", a project under the National Basic Research Program; "Research on Testing Technologies for the Trace and Ultra-trace of Dioxin, Polychlorinated Biphenyls and Propylene Chlorohydrin" and "Research on Food Pollutant Monitoring and Health Effect Evaluation", projects under the Key Technologies R&D Programme for "Tenth Five-Year" Plan, etc. The National Natural Science Foundation of China has supported nearly one hundred projects on POPs monitoring, distribution, toxicology, degradation, etc.

Although China has carried out the above monitoring and research work, POPs-related monitoring data is still deficient and information disclosure and sharing mechanisms have not been well established. Neither the comprehensiveness of data nor the geographic range covered by the data can meet the requirements for assessing POPs risks and their hazards to the environment.

2.3.8 Environmental Consciousness and Information Exchange

In recent years, China has launched successively a number of large-scale publicity activities, propagandizing via newspapers, TV, the Internet, etc., the POPs hazards, Convention requirements and the progress in Convention implementation, as well as scientific knowledge about POPs control.

Officials of the Chinese government and staff of industry associations can acquire knowledge of the features and hazards of POPs and control of them through routine work, data collection and sorting, and exchanges at meetings and training sessions, and thus have a relatively high level of awareness. Among the people engaged in the production, sale and use of POPs, except for some corporate managerial personnel who have received some training and have certain knowledge about the toxicity of POPs, production workers have little knowledge about POPs. The public in China knows about the features and hazards of POPs mainly through news media such as TV, radio and the Internet, publications like newspapers, books and magazines, as well as advertisements, but have a low overall awareness of POPs hazards.

Since the establishment of the Leading Group for Development of the NIP in 2003 and the NCG in 2005, exchanges and communications concerning POPs-related information between government departments and industrial institutions have been enhanced. The channels for information exchange between the government and enterprises, and between the government and the general public, are experiencing expansion, and relevant organs and mechanisms are being established and improved gradually.

Since the Stockholm Convention entered into force for China, local governments, enterprises, social organizations and the general public have increased demands for information on and participation and awareness in such aspects as: POPs hazards, pollution control plans, formulation and implementation of policies and regulations, etc. However, China needs to carry out information collection, sorting, release and exchange, by further focusing on actual requirements of Convention implementation, strengthen the Convention Implementation Office's management capability for information on the implementation of the Convention, promote sharing and disclosure of such information, and improve environmental awareness of the general public.

2.3.9 Relevant activities of non-governmental organizations

POPs-related industry associations in China include the Environmental Protection Industry Association, Petroleum and Chemical Industry Association, Building Materials Industry Association, Nonferrous Metals Industry Association, Iron and Steel Association, Electricity Council and Light Industry Confederation, etc. As a bridge linking the government and enterprises, these organizations have played a significant role regarding assisting the survey on inventories, assessing policies and technologies, promoting alternative technologies and communicating policies and training in POPs reduction and control processes.

At present, there are over 2,000 non-governmental environmental protection organizations in China. These organizations have played active roles in communication and education, surveying of public opinions, consultation, environmental rights maintenance, etc., but are still at a beginning stage in activities concerning POPs.

2.3.10 Basic situation of monitoring and R& D

China has begun to establish a system of environmental monitoring networks. The departments concerned, and industrial and provincial environmental monitoring centers (or stations), are generally equipped with large-sized analytical instruments such as atomic absorption analyzers, ion chromatographs, gas chromatographs, liquid chromatographs, gas chromatograph/mass chromatograph analyzers, etc.

At present, monitoring units below the provincial level have insufficient hardware for POPs monitoring, and the standards and systems for monitoring POPs have yet to be established and improved. Normative management of laboratories needs to be further strengthened and their technological capacity has yet to be improved, particularly, their lack of simple testing technologies for Dioxin in China.

Currently, more and more scientific research institutions, colleges and universities are carrying out POPs research activities, including: research on the environmental pollution, concentration and distribution characteristics of a variety of POPs; research on quick testing technologies for POPs substances; and research on POPs degradation technologies and environmental remediation technologies. However, the POPs research capability of these institutions has yet to be enhanced, for which the uniform planning, organization and financial assurance adaptive to the requirements of Convention implementation should be done, scientific research results exchanged and information sharing strengthened.

China has begun to be able to produce pesticide POPs alternatives. However, China needs to strengthen its capability for independent development and focus on research and development of efficient, low-toxicity, environmentally sound and cost-effective alternatives and alternative technologies, particularly IPM (Integrated Pest Management) technologies, because the alternatives require relatively high costs and their performance cannot meet the requirements for substitution.

Because of restrictions of research conditions, relevant research on Dioxin has been conducted modestly. This only included some testing of Dioxin content in environmental media conducted in few regions as well as a little research on the formation mechanism and bioaccumulation of Dioxin.

There exists a gap in research and development of technologies for Dioxin release reduction and, in particular, research has not yet been carried out concerning applicability of the technologies for Dioxin release reduction as indicated in BAT/BEP Directive of the Convention. Therefore, the research and development capability of China regarding reducing Dioxin releases urgently needs to be improved.

2.3.11 Affected groups and environments

Groups likely being affected by POPs mainly include those involved in the production, distribution and use of POPs and groups living around POPs release sources and storage sites, particularly women and children. Groups directly exposed to POPs include all sorts of people producing and using POPs (or substances containing POPs), as well as people exposed during distribution of POPs, but they have different levels

of exposure. Operating staff of POPs enterprises engaged in the production, preparation, packing or transportation of POPs, as well as pesticide users in agriculture and forestry, have a relatively high level of exposure.

In China, POPs monitoring in recent years found that the concentration of residual pesticide POPs is relatively high in water bodies of a small number of estuaries, and that the concentration of pollution caused by POPs is relatively high in the soils of wastewater irrigated farms, vegetable plots and sites of pesticide POPs production and storage. Dioxin of relatively high concentration was detected in the organisms, sediments and soils around a few lakes in central and east China, the sediments of some maritime zones of the East and Yellow Seas, the schistosomiasis affected areas in south China, and the sediments of the Pearl River Delta. Dioxin content in blood samples of humans and in human breast milk in sodium pentachlorophenol contaminated areas and schistosomiasis affected areas, was found to be higher than that of normal persons.

Surveys conducted in a few DDT and PCBs contaminated sites that have been identified, also showed that DDT and PCBs content in some foods, like milk and eggs, in the sites exceeds related national standards.

Due to lack of the systematic monitoring and risk evaluation of POPs impacts on the environment and human health, it's still hard to determine impacts of POPs on China's ecological environment and public health.

2.3.12 Evaluation and registration of new chemicals

According to the *Measures on the Environmental Management of New Chemicals* promulgated in 2003, the state implements a declaration and registration system for the environmental management of new chemicals prior to production or import of them. The term "new chemicals" refers to any chemicals that have not been produced within or imported into the territory of the People's Republic of China before they are declared. The contents for the declaration and registration of a new chemical substance include the name, molecular structure, testing methods, purpose, annual output or import volume, physical and chemical properties, toxicological and ecotoxicological characteristics, accident prevention and emergency measures, pollution prevention and elimination methods, waste disposal measures, etc., of the new chemical substance. The State Environmental Protection Administration organizes the execution of evaluation on new chemicals in accordance with relevant standards and specifications, and is responsible for the registration of them.

2.3.13 Evaluation and management of existing chemicals

The safety management system for hazardous chemicals established pursuant to the *Regulations on Safety Management of Hazardous Chemicals* is a basic management system to regulate existing industrial and commercial chemicals in the market currently in China. The Regulations: set up a national framework system for the management of chemicals involving multiple departments with each responsible for a particular field of work; covers the whole process from the production, operation, storage, transport and use to waste disposal of hazardous chemicals; and establishes management systems regarding listing of hazardous chemicals, chemical safety

specification, chemical safety labeling, the review, permit and safety evaluation of economic activities related to hazardous chemicals, registration of hazardous chemicals, first aid for hazardous chemical accidents, etc.

China has established a pesticide safety management system aimed at regulating this category of high-risk chemicals. The *Regulations on Pesticide Management* regulated the pesticide registration system, the pesticide production permit system, pesticide distribution permit system and the management system for safe use of pesticides.

China has also established special laws and standards with regard to every-day chemicals, like cosmetics, as well as to food additives. These laws and standards clearly forbid or limit the use of toxic or harmful chemicals in food and provide limits for the use or content of a variety of harmful chemicals in food and cosmetics.

Its industrial macro-control system also plays a regulating role in the production and use of existing chemicals in the market. The Chinese government promulgates, on a regular basis, the policies related to the national industrial and product restructuring, such as the *Provisional Regulations on Promoting the Industry Restructuring* and the *Guiding Catalogue of Industrial Structure Regulation*, etc., which set out limitations on or phase-out of a variety of existing high-toxicity and high-risk chemicals including DDT, hexachlorobenzene, chlordane, mirex, PCBs and other POPs chemicals.

In order to implement related international conventions, China has established a management system for the import and export limitation of some toxic chemicals of international concern, in terms of import and export management. This system includes, for instance, the *Regulations on Environmental Management of the First Import of Chemicals and the Import and Export of Toxic Chemicals* promulgated in 1994 and the *List of Toxic Chemicals Banned or Severely Restricted in the People's Republic of China* promulgated later, both covering the toxic chemicals that the Rotterdam Convention and the Stockholm Convention require to be controlled.

At present, China's evaluation of existing chemicals is basically within the confines of scientific research and a relevant risk assessment system has not yet been established.

2.4 Requirements analysis on management of convention implementation

China already has some management systems concerning POPs, which have regulations on each sector for the whole lifecycle of a POPs project from its establishment, production, storage and transportation, distribution, use, import and export to disposal. Management means include mandatory legal systems and guiding policies encouraging enterprises to implement voluntarily, as well. Involvement of social intermediaries, particularly those certified or recognized by administrative departments in charge, renders assistance and support to the implementation of the management systems.

Nevertheless, a big gap exists between China's POPs management systems and what are required for Convention implementation. Very few management objectives involve POPs with significant impacts on environmental quality, and some management regulations have not been effectively implemented. The following are

major problems that exist in POPs management.

- Lack of effective communication between administrative departments. Lack of effective routine communication and coordination between departments involved in POPs management results in information communication not being conducted in a timely way and is unfavorable for the effective implementation of POPs work for Convention implementation.
- Inadequate Convention implementation capacity of administrative organs. A severe shortage of POPs management personnel in each concerned department, and their weak management capacity, cannot meet requirements of POPs management for Convention implementation.
- Technical support system for management not being well established. There is a lack of an expert support system as well as guidance on technologies concerning POPs management, and the POPs monitoring and information support systems have not yet been established.
- Management laws and regulations not being well established. There exists a gap in present environmental management laws and standards regarding POPs pollution control. Regulations on POPs management are spread over varied laws and policies, which is unfavorable for forming an integral binding force. Among established regulations on POPs management and pollution control, some lack relevant legal liability and some are less operable.
- Inadequate law enforcement and supervision capacity and public participation. Some regions are not fully aware of environmental protection and POPs issues, still have a tendency for local protectionism, and do not fulfill their responsibilities for law enforcement. The awareness of public participation in POPs management is weak and participation channels are not clear.
- Insufficient integrated management measures. Most of the present management measures are in the form of administrative orders. There is a lack of market incentives concerning the development and application of POPs alternatives and alternative technologies, technologies for reduction of Dioxin releases and technologies for disposal of POPs wastes and contaminated sites, and diversified financial mechanisms for addressing POPs issues with participation by all parties concerned.

See Annex I for present related policies and requirements analysis in contrast with the requirements under the Stockholm Convention.

Chapter 3 Strategy and Action Plan

3.1 National Strategy

3.1.1 Overall objective

Reduce, eliminate and prevent the health and environmental risks posed by POPs through effective implementation of the Stockholm Convention, helping to maintain healthy development of humans, safeguarding ecological environmental safety, promoting sustainable development, and building a harmonious society.

The Chinese government solemnly commits to fulfill the relevant responsibility specified by the Convention, comply with the national strategy of sustainable development and, given the support by the Convention's financial mechanism and technology transfer mechanism. incorporate requirements of Convention implementation into the relevant plans of the state. Additionally, China commits to establish and improve corresponding administration systems, develop and implement related policies and necessary action measures so as to achieve the control objectives required by the Convention, i.e., to reduce or eliminate the production and use of pesticide POPs, to eliminate the use of PCBs, to reduce or eliminate releases of unintentionally produced POPs, and to gradually take measures to reduce or eliminate POPs releases from POPs stockpiles, wastes and contaminated sites.

China will, by combining actions for Convention implementation with the objectives of “promoting the optimization and upgrading of industrial structure” and “constructing a resource-saving and environment-friendly society” set out in the *Outline of the Eleventh Five-Year Plan*, adjust product and industrial structures, promote cleaner production, develop a cyclic economy, boost effective utilization of resources, create new economic growth openings and increase employment opportunities, improve the environmental awareness of the whole society and the level of public participation, and ultimately promote sustainable development.

In addition to the aforementioned, China will, based on its actual situation, improve policies and regulations designed to fulfill the objectives of Convention implementation, strengthen institutional capacity building, take relevant strategies and actions, and carry out Convention implementation activities by stage, region and industry, so as to achieve the following objectives:

- (1) prohibit and prevent the production and import of aldrin, dieldrin, endrin, heptachlor, hexachlorobenzene, toxaphene and PCBs; begin to eliminate the production, use, import and export of chlordane, mirex and DDT by 2009, except for the production and use of DDT as a closed-system site-limited intermediate and for acceptable purposes; and achieve the environmentally sound management of currently used equipment containing PCBs in demonstration provinces and identified high-risk equipment containing PCBs currently used by 2015;
- (2) apply BAT/BEP measures for new sources in key sectors with unintentional POPs release by 2008, and apply prioritized BAT/BEP measures for existing

Dioxin release sources in key sectors of key regions, and basically control the increasing trend of dioxin release by 2015;

- (3) improve support systems for the environmentally sound management and disposal of POPs wastes by 2010 and begin to achieve the environmentally sound management and disposal of identified POPs wastes by 2015.

3.1.2 Priority Areas

The priority areas under the National Implementation Plan include the following aspects:

- (1) Formulate and improve the policies and regulations required for Convention implementation and strengthen institutional building;
- (2) Introduce and develop alternatives/alternative technologies, BAT/BEP, waste disposal technologies and contaminated site remediation technologies;
- (3) Eliminate the production and use of chlordane, mirex and DDT;
- (4) Investigate and update the inventory of unintentionally generated POPs releases and the inventories of electrical equipment containing PCBs and wastes containing POPs;
- (5) Adopt BAT/BEP to control Dioxin releases in key industries;
- (6) Establish a financial mechanism so as to ensure the implementation of various action plans;
- (7) Carry out demonstration projects and replication programs; and
- (8) Strengthen capacity building and establish a long-term, effective mechanism to control POPs releases.

3.1.3 Specific objectives

In order to effectively implement the Stockholm Convention and control POPs releases, the following objectives of China's implementation of the National Implementation Plan are formulated pursuant to the Convention's different time requirements on POPs control, the present situation of POPs pollution in China and the technological, economic and administrative feasibility of control actions.

Objectives by 2010

- (1) Elimination of the production, use, import and export of pesticide POPs:
 - (a) Prohibit the production and use of HCB by 2008;
 - (b) Basically eliminate the production and use of chlordane and mirex by 2009;
 - (c) Make an effort to phase out the production and use of DDT by 2009 (except for the production and use of DDT as a closed-system site-limited intermediate and for acceptable purposes);
 - (d) Prohibit the import and export of DDT for any purpose by 2009.
- (2) Control of PCBs use in PCBs-containing equipment in use:
 - (a) Establish a sound system for the declaration, registration and environmentally sound management of currently used equipment containing PCBs by 2010.
- (3) Reduction or elimination of releases of unintentionally produced POPs:

- (a) Begin to establish a management system for effective implementation of BAT/BEP in key industries unintentionally producing POPs, accomplish the application of BAT for new sources of key industries, and promote BEP by 2008²⁴;
 - (b) Give priority to updating the inventory of sources in key industries unintentionally producing POPs and estimates of their releases, and establish a relatively complete inventory of unintentionally produced POPs by 2010;
 - (c) Establish a relatively complete management system for the implementation of BAT/BEP for existing sources of unintentionally produced POPs in key industries, and complete relevant demonstration activities by 2010.
- (4) Reduction or elimination of releases from POPs stockpiles and wastes:
- (a) Establish a preliminary system for the environmentally sound management of POPs stockpiles and wastes by 2010;
 - (b) Complete the environmentally sound management and disposal of 30% of pesticide POPs wastes identified nationwide by 2010;
 - (c) Complete the environmentally sound management and disposal of PCBs wastes in demonstration areas by 2010.
- (5) Other measures and targets:
- (a) Timely incorporation of the processes, technologies, equipment and products related to POPs releases into the *Guiding Catalogue for Industry Restructuring*, and implement encouragement, restriction and phase-out pursuant to the time requirements under the Convention.
 - (b) Strengthen the environmental monitoring of POPs releases, evaluate impacts of POPs on the environment and human health, and develop or update relevant environmental and hygienic standards;
 - (c) Study and develop alternatives/alternative technologies, BAT/BEP, waste disposal and contaminated site remediation technologies required for China's Convention implementation and strengthen the building of relevant infrastructure;
 - (d) Establish a financing mechanism in which multilateral/bilateral funds, central and local finance, and corporate and private funds are combined, to ensure demands for funding to reduce and control POPs releases are met;
 - (e) Enhance the infrastructure and capacity building for research, development, monitoring, evaluation and management relating to POPs;
 - (f) Raise public awareness and establish and improve mechanisms for public participation in POPs management.

Objectives by 2015

- (1) Elimination of the use of PCBs in currently used equipment containing PCBs:
 - (a) Achieve the environmentally sound management and disposal of currently used equipment containing PCBs, with identified high risk,

²⁴ The specific date will be adjusted subject to approval of the BAT/BEP guidelines by the Conference of the Parties.

across the country by 2015.

- (2) Reduction or elimination of releases of unintentionally produced POPs:
 - (a) Apply BAT/BEP in key industries with unintentionally produced POPs and begin to control the upward trend of dioxin releases by 2015.
- (3) Reduction or elimination of releases originating from POPs stockpiles and wastes:
 - (a) Begin to achieve the environmentally sound management and disposal of pesticide POPs wastes across the country by 2015;
 - (b) Achieve the environmentally sound management and disposal of high-risk PCBs-containing wastes indicated in the inventory for the first phase by 2015;
 - (c) Fulfill the environmentally sound management and disposal of identified Dioxin wastes released by key industries by 2015.
- (4) Management and disposal of POPs contaminated sites:
 - (a) Establish an inventory of pesticide POPs contaminated sites and begin to form an inventory of sites contaminated by PCBs and Dioxin by 2015.
 - (b) Establish environmentally sound management and remediation support systems involving management, eventual land use, environmental remediation, etc., of POPs contaminated sites by 2015.

Long-term objectives

- (1) Eliminate, gradually, the production and use of DDT as a closed-system site-limited intermediate and for acceptable purposes;
- (2) Complete the identification of currently used equipment containing PCBs and eliminate uses of PCBs by 2025.
- (3) Promote BAT and BEP in all relevant areas for maximum reduction of dioxin releases.
- (4) Improve the lists of POPs wastes and POPs contaminated sites and gradually eliminate contamination caused by them.

3.2 Implementation measures

Related departments, local governments and industries will incorporate respective tasks into their own work plans and organize the implementation of them in accordance with requirements of the NIP.

The NCG will: be fully responsible for the guidance and coordination of China's Convention implementation; regularly supervise, summarize and evaluate progress in Convention implementation; organize and conduct performance evaluations; and adjust and update the NIP on a timely basis. The State Environmental Protection Administration will be in charge of organizing member departments to implement the NIP and other departments concerned will be responsible for their respective actions, so that various aspects of Convention implementation will be promoted smoothly.

Strengthen the capacity for Convention implementation of the NCG and its agencies, related departments and local governments, establish a decision-making support

system for Convention implementation, and build and improve technical support mechanisms; encourage and support the establishment of relevant leadership and coordination organs in regions with severe POPs contamination or with better-off conditions, so as to organize and carry out Convention implementation activities.

Build and improve the system of policies and regulations, integrate the control and reduction of POPs into the relevant policies and legal system, and strengthen law enforcement and the building of the enforcement forces. Adhere to the principle of “prevention first” and strengthen policy guidance and regulatory controls on the reduction and control of POPs releases. Actively adopt economic instruments appropriate for the market economy system to promote the reduction and control of POPs releases.

Make an effort to ensure adequate investments and, through financial arrangements of the government and on the principle of “polluters pay” and “beneficiaries compensate”, promote the building of the financial mechanism of China for reduction and control of POPs releases to guarantee the domestic demands for funding for Convention implementation. Fully utilize the financial and technology assistance mechanisms under the Convention, extensively develop international cooperation, actively absorb international advanced technologies and experience, and seek financial and technology support from the international community.

Improve the fund efficiency, facilitate progress in Convention implementation, reduce risks associated with Convention implementation, carry out activities of reducing and controlling POPs releases through demonstration projects and sector approach, and formulate industrial implementation plans or schemes based on specific situations of industries concerned; through fund integration, technology optimization, management improvement and market expansion, and taking the addressing of POPs issues as a starting point, promote the economic restructuring and growth pattern conversion of the fields involved in Convention implementation, and fuel the development of related industries.

As for pesticide POPs, by introducing, developing and promoting alternatives and alternative technologies, adopting integrated control and other means and issuing bans and other measures, phase out and control the production and use of pesticide POPs by stages, by regions and by industries, and ultimately eliminate the production and use of them completely.

For currently used electrical equipment containing PCBs, organize all-around investigation and tracking management as soon as possible for their withdrawal from use and disposal; make a thorough investigation of sealed sites of PCBs-containing out-of-service electrical equipment and the present status thereof, build disposal facilities, and conduct environmentally sound disposal of them by stages and by regions.

Regarding the unintentionally produced POPs, adhering to the principles of prevention first and comprehensive protection, first reduce and control POPs releases from their sources and positively promote cleaner production so as to meet the requirements related to BAT/BEP under the Convention. By implementing the environmental impact assessment system, the cleaner production audit and the

pollutant release control standard, ensure that new facilities limit POPs releases pursuant to requirements under the Convention. Apply BAT/BEP in combination with such projects indicated in the *Outline of the Eleventh Five-Year Plan* as key energy-saving projects, cyclic economy demonstration projects, and key environmental protection projects. Compulsorily phase out techniques and products that are technologically outdated and have serious pollution. Taking into consideration differences in regions and industries across China regarding economic development levels, rate of contribution to the total POPs release and extent of POPs hazard, different control targets and reduction schedules will be adopted.

The development of alternatives/alternative technologies, BAT/BEP and waste disposal technologies intended to control POPs releases shall be based on domestic technology developments as much as possible, and local innovation will be encouraged. The elimination and control of POPs shall be carried out in phase with R&D and promotion of POPs alternative/control technologies so as to meet domestic demands and to ensure fundamentally the smooth development of Convention implementation actions.

Enhance the capacity of POPs research and monitoring institutions and organize and conduct systematic research. Actively promote the building of key national laboratories, formulate, modify and improve relevant environmental and hygienic standards, and promote basic research on POPs. Further conduct investigation into the status of POPs pollution, evaluate the social and economic impacts of POPs, and propose corresponding countermeasures and suggestions.

Mobilize broadly the publicity, educational, cultural and other departments to launch relevant activities on a continuing basis, arouse active participation of industrial associations, media and the general public, improve the whole society's environmental awareness and the level of public participation, so as to create a good social atmosphere for the work of Convention implementation.

3.3 Action plan

3.3.1 Building of institutional capacity and development of policies and regulations

Objective: Strengthen the institutional capacity and mechanism building, and establish and improve policies and regulations.

Gaps in Convention implementation:

- The present institutional capacity in such aspects as unified coordination, decision-making support, implementation organization, and supervision and evaluation cannot accommodate the requirements of Convention implementation.
- The existing policies and regulations are weak with respect to POPs and need to be integrated, complemented and improved and need to be strengthened in terms of implementation.
- There is a lack of diversified investment and financing mechanisms, as well as incentives and constraint mechanisms concerning finance and taxation.

Co-benefits: Improve the lifecycle management of hazardous chemicals and pesticides, improve the environmental management systems and policies, enhance the national capacity for Convention implementation and improve implementation of other relevant conventions.

I. Institutions and capacity building

Action objective: Strengthen the capacity of related Convention implementation institutions in such aspects as: unified coordination, decision-making support, organization and implementation, supervision and management, and analysis and evaluation, so as to ensure the effective implementation of the NIP.

Action 1: Capacity building for the NCG

Specific actions: Implement Work Rules for the NCG and enhance the NCG's capacity for unified coordination, implementation organization; and establish an expert committee composed of senior experts from departments of environmental protection, agriculture, public health, construction, and other industrial departments, and associations, enterprises and scientific research institutes. It will be responsible for providing the NCG with advice on such aspects as relevant policies, laws and regulations, standards and technologies and participate in discussions with regard to major issues of Convention implementation.

Action 2: Capacity building for departments involved in Convention implementation

Specific actions: Strengthen the capacity of the member departments of the NCG in policy making, data collection, information exchange and supervision and management; and provide training to relevant officials of these departments and their subordinate technical support institutes in accordance with the requirements of Convention implementation.

Action 3: Capacity building for the NCG Office

Specific actions: Establish a management team adapted to the requirements of Convention implementation; establish and improve joint working mechanisms of relevant departments; establish and improve mechanisms for information management on Convention implementation; track the global progress on Convention implementation, and propose policy and action suggestions for the state; coordinate and organize the development and implementation, fund planning and raising of Convention implementation projects; launch publicity, education, training and technical assistance; organize and conduct the effectiveness evaluation of Convention implementation and NIP implementation performance; and strengthen the capacity building for infrastructure and management of the Office.

Action 4: Capacity building for local departments involved in Convention implementation

Specific action: Improve the awareness of Convention implementation at local levels; strengthen the capacity for making related policies and programs at local levels, as

well as for the implementation of and fund raising for Convention implementation activities; strengthen capacity for information collection, analysis, reporting and management; and launch publicity, education and training.

Action 5: Capacity building for sectors related to Convention implementation

Specific actions: Raise the awareness of related sectors on Convention implementation; strengthen the organization and coordination capacity of institutions in related sectors regarding the work of Convention implementation; strengthen the capacity of information collection, analysis, reporting and management; strengthen the capacity for follow-up evaluation and promoting the application of BAT/BEP, alternatives/alternative technologies and disposal technologies; and launch publicity, education and training.

II. Develop and improve laws and regulations on POPs management

Action objective: Incorporate the requirements of Convention implementation in the existing legal and regulatory system by taking into consideration the national economic and social development plan; develop new regulatory management rules to address the requirements for Convention implementation which are not included in the system of existing laws and regulations.

Action 6: Develop a plan for the development/revision of relevant laws and regulations

Specific actions: The State Environmental Protection Administration will, together with related departments, and set forth a plan for the development/revision of relevant laws and regulations, and integrate the requirements of Convention implementation into the legislative agenda by following the state procedures, whereby defining regulations on the control over POPs production, distribution, use, import and export, wastes, emission and contaminated sites.

Action 7: Develop the *Regulatory Measures or Guidance Policy on the Reduction and Control of Persistent Organic Pollutants (POPs)*

Specific actions: Develop the *Regulatory Measures or Guidance Policy on the Reduction and Control of Persistent Organic Pollutants (POPs)* by 2009, in view of the urgent policy needs of Convention implementation arising from POPs pollution control, particularly from pollution minimization in the production and use of POPs and Dioxin pollution control.

III. Build the standards' system for POPs management

Action objective: Develop and revise the standards and technical specifications for POPs management so as to control pollution by and releases of POPs.

Action 8: Revise related environmental quality standards

Specific actions: By 2010, revise the environmental quality standards in such aspects involved with POPs as air, water, soil, etc., including the *Ambient Air Quality*

Standard (GB3095-1996); the *Environmental Quality Standard for Surface Water* (GB3838-2002); the *Environmental Quality Standard for Ground Water* (GB/T14848-1993); the *Standards for Irrigation Water Quality* (GB5084-1992); the *Environmental Quality Standard for Soils* (GB 15618-1995); the *Water Quality Standard for Fisheries* (GB 11607-1989); and the *Sea Water Quality Standard* (GB3097-1997).

Action 9: Revise or develop related product quality standards, health standards and other standards

Specific actions: Revise or develop product quality standards and health standards involved with POPs as soon as possible and, in particular, add standards concerning Dioxin. Specifically, revise hygienic standards for food and agricultural products; formulate standards on dioxin content limits in related food; and formulate or revise standards on content limits of Dioxin and PCBs in related feed. In addition, track the ongoing listing of additional POPs, and conduct research, development or revision of standards on content limits of POPs in related products. Actively adopt the *Global Harmonized System of Classification and Labeling of Chemicals* (GHS).

Action 10: Revise or develop emission standards for pollutants in key industries

Specific actions: Revise the existing standards or develop Dioxin emission standards aiming at key industries with Dioxin releases by 2010.

Action 11: Develop cleaner production standards, technology policies or specifications for key industries

Specific actions: Formulate cleaner production standards, technology policies or specifications for relevant industries, aiming at the main industries related to POPs, including pesticide POPs production, municipal waste incineration, hazardous waste incineration, medical waste incineration, coke, steel, copper smelting, cement, paper making, cremation, etc., by 2010.

IV. Revise and improve the existing lists relating to POPs management

Action objective: In accordance with the requirements of and progress in Convention implementation, complement and improve the management lists related to POPs, in combination with the existing list management system.

Action 12: Revise the *List of Hazardous Chemicals* and the *List of Dangerous Goods*

Specific actions: Include POPs regulated by the Convention in the *List of Hazardous Chemicals* and the *List of Dangerous Goods*.

Action 13: Revise the *Guiding Catalog of Industrial Structure Regulation*

Specific actions: Include aldrin, dieldrin, endrin and toxaphene into the *Guiding Catalog of Industrial Structure Regulation* by 2009; and based on the characteristics of new sources in key industries, list the technologies and equipment closely related to

Dioxin releases into the *Guiding Catalog of Industrial Structure Regulation* by 2008. See section 3.3.7 for Action Plan.

V. Strengthen enforcement and encourage public participation

Action objective: Strengthen the enforcement and implementation of existing policies and regulations; improve gradually the social oversight mechanism and encourage public participation.

Action 14: Strengthen enforcement

Specific actions: Carry out training for the enforcement departments regarding the relevant policies and regulations, as well as for Convention implementation; strengthen the capacity of enforcement forces and enforcement supervision, so as to ensure the effective implementation of relevant policies and regulations.

Action 15: Promote public participation

Specific actions: Encourage the general public to take part in decision-making processes such as the formulation of policies, strategies and plans related to Convention implementation, so as to create a good social atmosphere for Convention implementation; establish incentive mechanisms for Convention implementation so as to promote general public participation in Convention activities to the best of their ability; improve the normalization and transparency of management and enforcement in Convention implementation, and accept public oversight; publicize Convention implementation achievements via TV, radio, newspapers, etc., and encourage the public to participate in the effectiveness evaluation of the Convention implementation.

VI. Carry out evaluation and research of the Convention implementation mechanisms and policies

Action objective: Provide support for the establishment and improvement of economic policies and investment and funding mechanisms concerning POPs reduction and elimination, as well as for the building of a relevant legal system.

Action 16: Carry out the study of POPs impacts and the evaluation and study of candidate and newly listed POPs

Specific actions:

- (1) Analyze, study and evaluate the impacts of POPs on society, economy and international trade, and study the environmental and health impacts of, and benefits from, the elimination and reduction of POPs.
- (2) Track the progress of the Convention regarding new POPs additions, organize and conduct, as appropriate, the investigation, monitoring and evaluation of existing chemicals as candidates and newly added POPs under the Convention, propose relevant measures and suggestions, and carry out demonstration activities on phase-out or substitution of them.

Action 17: Promote the study of policies pertaining to alternatives, alternative technologies and pollution control technologies

Specific action: Establish and improve policies intended to encourage innovation; promote the R&D and application of alternatives, alternative technologies and pollution control technologies by employing market mechanisms and through incentives for efficiency by such means as environmental labelling and government green procurement, so as to promote the development of industries pertaining to environmental protection and increase competitiveness of products in the market.

Action 18: Carry out the study of financial mechanisms and economic policies

Specific actions: In addition to the financial mechanism under the Convention, explore and establish a financial mechanism combining multilateral/bilateral finances, central and local finances and corporate and private finances; study and formulate the economic incentive and constraint mechanisms that help control POPs pollution.

Action 19: Regional demonstration

Specific actions: Choose regions with relevant conditions to conduct the work of demonstration, focusing on POPs management or control, in combination with the implementation of the National Implementation Plan. Investigate the production, use and release of POPs in demonstration regions; analyze their management capacity, existing system and implementation results on POPs and other toxic and hazardous substances; analyze the social, economic and environmental impacts brought about by controlling POPs and other toxic and hazardous substances; and formulate and implement plans concerning controlling POPs and other toxic and hazardous substances.

Action 20: Carry out the evaluation of NIP implementation effectiveness and the study of countermeasures to mitigate POPs impacts

Specific actions:

- (1) Study indicators used for the evaluation of NIP implementation effectiveness, analyze demands for the evaluation of NIP implementation effectiveness, work out related steps and implementation procedures, formulate plans for the evaluation of NIP implementation effectiveness, and carry out NIP evaluation as appropriate.
- (2) Study and formulate, as appropriate, the measures and action plans pertaining to the mitigation of POPs impacts for different areas.

3.3.2 Measures to reduce or eliminate releases from intentional POPs production and use

Strengthen inter-agency cooperation and coordination for the Convention implementation, further improve the joint working mechanism of departments concerned, carry out studies on development strategies for industries involved in POPs, and effectively implement Convention implementation actions for eliminating intentionally produced POPs.

Eliminate the production and use of intentionally produced POPs beyond specific exemptions and acceptable purposes by such measures as promulgation of bans;

prohibit or rigidly control the import and export of intentionally produced POPs; and encourage the development and application of environmentally sound and economically feasible POPs alternatives/alternative technologies. For the production and use of intentionally produced POPs for exemptions and for acceptable purposes, implement rigorous volume control measures and measures to mitigate environmental hazards.

Improve the environmental management system for PCBs; define the management procedures and requirements for the declaration, registration, online operation, emergency response and off-line disposal of electrical equipment containing PCBs; establish active inventory and tracking management mechanisms so as to avoid release in the environment; and prohibit the use of PCBs in electrical equipment in areas involving the production or processing of food or feed.

Implement rigidly the cleaner production audit system and the standards pertaining to product quality control, so as to control POPs releases from the production of intentionally produced POPs for specific exemptions and for acceptable purposes to the lowest level.

Establish standards and guidance for various the management aspects for electrical equipment containing PCBs currently in use, including identification, labeling, operating maintenance, transport, storage, abandonment, environmental monitoring, etc., so as to minimize environmental risks.

Through demonstrating and promoting alternatives and alternative technologies, phase out and eliminate the production and use of POPs for specific exemptions and for acceptable purposes by stages, by regions and by sectors.

Give priority to disposal of high-risk electrical equipment containing PCBs currently in use, and eliminate gradually the use of PCBs as required by the Convention.

By reference to the POPs assessment criteria listed under the Convention, establish a risk evaluation mechanism, improve the management systems for evaluation and registration of new chemicals, prevent the production and use of new POPs pesticides or industrial chemicals, and formulate and implement, as appropriate, the risk management policies or schemes to address POPs pesticides and industrial chemicals.

Improve the awareness of related management departments, industrial and social groups and the public regarding their participation in the risk management of intentionally produced POPs.

3.3.3 Actions for the reduction or elimination of the intentionally produced and used pesticide POPs listed in Part I of Annex A under the Convention

Objective: During the period for specific exemptions, gradually reduce or eliminate the production and use of HCB, chlordane and mirex, implement release minimization controls in their production and use exemptions, and rigidly control their import and export.

Gaps in Convention implementation:

- Lack of incentive policies and actions for the promotion of chlordane and mirex alternative technologies in the prevention and control of termites;
- Lack of specific laws and regulations prohibiting the production and use of HCB used as a chemical intermediate;
- Lack of regulations for release control minimization in the exempted production and use of pesticide POPs;and
- Lack of relevant publicity and educational activities.

Co-benefits: Optimize the products' structures of pesticides and chemicals and promote R&D and application of environmentally sound alternatives or integrated pest management (IPM), while reducing and eliminating the local and global environmental and health risks caused by HCB, chlordane and mirex.

Action 1: Rigidly restrict and gradually eliminate the production and use of chlordane and mirex

Action objective: Basically eliminate the production and use of chlordane and mirex by 2009.

Specific actions:

- (1) The Ministry of Construction will formulate technology policies and criteria to prevent the use of POPs-like toxic chemicals and encourage the application of IPM in termite prevention and control.
- (2) The Ministry of Science and Technology will, together with the Ministry of Construction, the State Environmental Protection Administration and Ministry of Agriculture, promote the research, development and application of environmentally sound pesticides or IPM for termite prevention and control.
- (3) The State Environmental Protection Administration will, together with the Ministry of Construction and the Ministry of Agriculture, organize the implementation of the demonstration project of alternatives to chlordane and mirex in termite control, so as to gradually phase out the production and use of chlordane and mirex by regions.
- (4) The State Environmental Protection Administration will, together with relevant industrial departments in charge, organize the industrial associations to carry out training and publicity activities regarding alternatives to chlordane and mirex in termite control for institutions involved in sector management and termite control stations.

Action 2: Prohibit the production and use of HCB

Action objective: Prohibit the production and use of HCB by 2008.

Specific actions:

- (1) In 2008, the National Development and Reform Commission will, together with the Ministry of Agriculture and the State Environmental Protection Administration, update the original regulations pertaining to HCB in the *Guiding Catalog of Industrial Structure Regulation* and definitely stipulate that HCB shall be immediately phased out pursuant to the NIP and that continuing to produce and use it shall be prohibited.
- (2) The National Development and Reform Commission will, together with the

State Environmental Protection Administration and the Ministry of Agriculture, check the fulfillment of the enterprises which ever produced HCB or used HCB as an intermediate to produce PCP and sodium pentachlorophenol.

Action 3: Strictly implement laws and regulations pertaining to prohibiting the import and export of the chemicals listed in Part I of Annex A under the Convention

Action objective: Strictly enforce laws and regulations so as to prevent the import and export of intentionally produced POPs listed in Part I of Annex A under the Convention.

Specific actions: Together with the General Administration of Customs and the Ministry of Commerce, the State Environmental Protection Administration will, pursuant to the *Regulations on Environmental Management of the First Import of Chemicals and the Import and Export of Toxic Chemicals*, prevent the import and export of the pesticide POPs (aldrin, chlordane, dieldrin, endrin, heptachlor, HCB, mirex and toxaphene) listed in Part I of Annex A under the Convention.

Action 4: Control pollution caused by chlordane and mirex in their production, distribution and use for specific exemptions

Action objective: Accomplish the minimization of pollution by POPs in their production and use for specific exemptions.

Specific actions:

- (1) The State Environmental Protection Administration will, pursuant to stipulations of the *Auditing Methods for Cleaner Production and Regulations on the Auditing Procedure for Cleaner Production of Key Enterprises*, carry out supervision and inspection of enterprises that produce chlordane and mirex in respect of compulsory cleaner production auditing, so as to control and minimize pollution caused by POPs in production and processing.
- (2) The State Environmental Protection Administration will, together with departments concerned, organize industrial associations to provide training to existing enterprises and stations with exempted production and use of chlordane and mirex, so as to effectively control POPs releases and exposures to humans during production and use.
- (3) The State Administration of Work Safety, the State Environmental Protection Administration, the National Development and Reform Commission, the Ministry of Agriculture, the Ministry of Construction and other departments concerned will implement rigorous supervision and management of the stockpiles of existing chlordane and mirex producers, distributors and users, including: the supervision and management of the status of safety and environmental protection measures for chlordane and mirex stockpiles, so as to prevent the stockpiles from causing exposure to humans, leakage and environmental pollution; and the monitoring of the quantity and destination of the stockpiles so as to prevent the illegal trade and distribution of them.

3.3.4 Actions for the identification, elimination and environmentally sound management of electrical equipment containing PCBs in use

Objective: Identify nationwide PCBs-containing equipment in use and manage it in an environmentally sound way. Accomplish the environmentally sound management of PCBs-containing equipment in use in demonstration provinces and of nationwide PCBs-containing equipment with high risk by 2015, and gradually eliminate the use of PCBs by 2025.

Gaps in Convention implementation:

- The inventory of equipment containing PCBs is incomplete and systems related to declaration, registration and environmental management, as well as relevant mechanisms, are not well established;
- The supervision and management capacity of the management institutions concerned is insufficient;
- The standards' system has not yet been established for the environmentally sound management of the identification, labeling, operating maintenance, transport, storage, abandonment and monitoring of currently used equipment containing PCBs;
- Most of the owners of PCBs-containing equipment lack understanding of the environmental and health risks caused by PCBs.

Co-benefits: Eliminate the ecological and health risks arising from currently used equipment containing PCBs, improve the environmental awareness and environmental management level of enterprises, and improve the environmentally sound management system for POPs.

Action 1: Improve the system for environmentally sound management of PCBs-containing equipment currently in use

Action objective: Establish an effective environmental management system for the declaration, registration, etc., of PCBs-containing equipment currently in use, by 2010.

Specific actions:

- (1) The State Environmental Protection Administration will, together with the State Electricity Regulatory Commission and other departments concerned: evaluate the effectiveness and implementation results of such rules and regulations as the *Regulations on Environmental Pollution Caused by Electrical Equipment Containing PCBs and Their Wastes (1991)*, the *Regulations on Operational Management of Electrical Equipment Containing PCBs (1991)*, the *Circular Concerning the Reporting of Electrical Equipment Containing PCBs and Their Wastes (1995)*, etc.; and study and establish an environmental risk control management system covering the declaration, registration, operation, emergency response in case of leakage, abandonment, storage and disposal of currently used equipment containing PCBs, in which management duties are clearly defined²⁵.

²⁵ There are to be at least 3 aspects that will be included: prohibit the use for PCBs equipment in food and feedstuff production and processing; unless for the purposes of repairing and service operation, recycling of liquid with PCBs content up to 0.005% for other equipment is prohibited; setup a deadline for retirement of

- (2) The State Environmental Protection Administration will, together with the State Electricity Regulatory Commission and other departments concerned, establish and improve technical standards and specifications for the environmentally sound management of the identification, classification, labeling, operating maintenance, transport, storage and abandonment of currently used equipment containing PCBs.

Action 2: Strengthen the capacity of related management institutions in charge of currently used equipment containing PCBs

Action objective: Related management institutions will have basic capacity for the environmentally sound management of currently used equipment containing PCBs, by 2010.

Specific actions:

Together with the State Electricity Regulatory Commission, the State Environmental Protection Administration will:

- (1) Evaluate results of the environmentally sound management of currently used equipment containing PCBs by management institutions (including power sector and other industries) regarding declaration, registration, etc. and, in combination with the implementation of relevant national and local capacity building plans, specifically define the duties and tasks of the management institutions;
- (2) Pursuant to the aforesaid duty arrangements for the environmental management of currently used equipment containing PCBs, strengthen the competencies of staff and facilities in such aspects as the identification, classification, operating supervision and monitoring, information management, etc. of currently used equipment containing PCBs, and provide training on environmental sound management of currently used PCBs equipment.

Action 3: Identify and label equipment containing PCBs in use, and gradually improve their inventories

Action objective: Accomplish the identification and labeling of currently used equipment containing PCBs, by 2020.

Specific actions: The State Environmental Protection Administration will, together with the State Electricity Regulatory Commission and the departments concerned: conduct durative survey and labeling on currently used PCBs equipment, and establish a risk evaluation mechanism; identify and label currently used equipment containing PCBs in demonstration provinces by 2008-2010; identify and label high-risk electrical equipment containing PCBs currently in use across the country, by 2015; identify and label equipment containing over 50 ppm PCBs currently in use across the country, by 2020.

Action 4: Conduct the removal of PCBs in PCBs-containing electrical equipment currently in use or the environmentally sound management of the equipment

Action objective: Complete the removal of PCBs in equipment containing PCBs currently in use or the environmentally sound management of the equipment.

Specific actions:

Together with the State Electricity Regulatory Commission and the industrial associations concerned, the State Environmental Protection Administration will:

- (1) Pursuant to the relevant existing and new specifications, evaluate the operating status and environmental risks of identified PCBs-containing equipment currently in use and specify the on-line management, off-line time limit and disposal requirements of the equipment;
- (2) Taking into consideration of the progress in and results of the identification and evaluation of PCBs-containing equipment currently in use, conduct on a continuing basis the removal of PCBs or the environmentally sound management of PCBs-containing equipment currently in use, and phase out the use of PCBs by stages. Accomplish the removal of PCBs or the environmentally sound management of PCBs-containing equipment currently in use in the demonstration provinces and high-risk PCBs-containing equipment currently in use across the country by 2015; begin to realize the removal of PCBs or the environmentally sound management of PCBs-containing equipment currently in use by 2020; and accomplish the removal of PCBs or the environmentally sound management of currently used equipment with PCBs content over 50ppm by 2025.

3.3.5 Actions to eliminate and restrict the production, use, import and export of DDT

Objective: Eliminate uses of DDT without specific exemptions, minimize its releases from production and use for exemptions and for acceptable purposes, strictly control its import and export, and make an effort to eliminate the production and use of DDT by 2009 (except uses as a closed-system site-limited intermediate and for acceptable purposes).

Gaps in Convention implementation:

- There still exist uses of DDT beyond the exemptions under the Convention, such as its use for marine antifouling paint;
- Lack of activities for evaluation of the necessity of continuing use of DDT for disease vector control;
- Lack of low-cost, effective and easy-to-use DDT alternatives/alternative technologies for the prevention and control of disease vectors;
- Supervision and management of the production and use of DDT needs to be strengthened further; and
- Residues of DDT intermediate in dicofol need to be effectively controlled.

Co-benefits: Replace pesticides and other chemicals containing DDT; promote research, development and application of environment-friendly chemicals for preventing and controlling disease vectors or of integrated control measures; improve and effectively implement policies on pesticides and chemicals

management; and improve the structure of related products.

Action 1: Strictly restrict and phase out the production and use of DDT

Action objective: Make an effort to reduce the production and use of DDT, and stop the production and use of DDT beyond acceptable purposes completely and as early as possible.

Specific actions:

- (1) The National Development and Reform Commission will, together with the Ministry of Health, the Ministry of Agriculture and the State Environmental Protection Administration, promulgate regulations strictly limiting DDT only to the intermediate use in dicofol production and to disease vector control in emergencies, and implementing quota management for its production and use, so as to definitely prohibit the production and use of DDT beyond the aforesaid purposes (DDT uses as an additive for marine antifouling paints are temporarily extended to the year 2009).
- (2) The State Environmental Protection Administration will, together with related departments, industrial associations and enterprises, carry out DDT elimination projects in the marine antifouling paint industry to promote the application of its alternatives, and prohibit completely, uses of DDT in production of marine antifouling paint by 2009.
- (3) The National Development and Reform Commission will, together with the Ministry of Agriculture and the State Environmental Protection Administration: evaluate the feasibility of reducing the production and use of dicofol and of terminating the production and use of DDT as a non closed-system intermediate for dicofol production; plan to adopt measures in 2009 to terminate production activities involving non closed-system use of DDT to produce dicofol; and at the same time carry out a feasibility study on stopping the production and use of DDT as the closed-system intermediate and demonstration activities for eliminating dicofol.
- (4) The National Development and Reform Commission will, together with the Ministry of Health, the Ministry of Agriculture and the State Environmental Protection Administration, approve temporarily reserving the DDT production capacity for disease vector control to meet the domestic need for disease vector control under emergency circumstances for epidemic prevention.
- (5) According to the requirements of the Convention and decisions of the Conference of the Parties, the Ministry of Health will, together with the State Environmental Protection Administration, cooperate with related international organizations like WHO in evaluating, on a continuing basis, the necessity of reserving the use of DDT in disease vector control, and in evaluating and promoting low-cost, effective and easy-to-use alternatives/alternative technologies to DDT use in disease vector control.
- (6) The National Development and Reform Commission will, together with the State Environmental Protection Administration and the Ministry of Agriculture, develop plans for elimination of DDT production based on market demands and the development of alternative technologies, including placing a limit on the maximum annual output of DDT, and make an effort to terminate the production and use of DDT except for use as a closed-system intermediate in dicofol production and for acceptable purposes.

- (7) The National Development and Reform Commission will, together with the Ministry of Agriculture, the State Administration of Work Safety, the Ministry of Health and the State Environmental Protection Administration, carry out rigorous supervision of the production, use, distribution and storage of DDT by domestic existing enterprises manufacturing DDT and dicofol, and strictly require them to implement their obligations pertaining to data declaration and registration and to report the relevant data to the State Environmental Protection Administration in a timely manner.

Action 2: Impose strict control on import and export of DDT

Action objective: Impose strict control on the import and export of DDT, and prohibit the import and export of DDT for any purpose by 2009.

Specific actions:

- (1) The State Environmental Protection Administration will, together with the General Administration of Customs and the Ministry of Commerce, restrict the import and export of DDT based on the *Provisions on Environmental Management on the First Import of Chemicals, and the Import and Export of Toxic Chemical*
- (2) Prohibit the import and export of DDT for any purpose by 2009.

Action 3: Control pollution from the production, distribution and use of DDT for exemptions and for acceptable purposes

Action objective: Minimize DDT releases from its production and use.

Specific actions:

- (1) Based on provisions of the *Provisional Measures for Cleaner Production Audit* and *Regulations on Audit Procedure for Cleaner production of Key Enterprises*, and by reference to the requirements of the Convention, the State Environmental Protection Administration will carry out supervision and inspection of DDT producing enterprises and dicofol producing enterprises with DDT as intermediate in respect of mandatory audits of cleaner production.
- (2) The Ministry of Agriculture, the State Environmental Protection Administration, the General Administration of Quality Supervision, Inspection and Quarantine and other related departments will strictly supervise enterprises in their implementation of the current product quality control standards for the presence of DDT intermediate in dicofol products and minimize DDT releases in its uses.
- (3) The State Administration of Work Safety, the State Environmental Protection Administration, the National Development and Reform Commission, the Ministry of Agriculture and other related departments will implement strict supervision and management of DDT stockpiles in existing DDT producers, distributors and users, including: supervision of the status of the safety and environmental protection measures for DDT stockpiles to prevent their exposure to humans, leakage and environmental pollution; and monitoring stockpile quantities and destinations to prevent illegal trade and distribution.
- (4) The State Environmental Protection Administration will organize related

industrial associations to carry out the training for existing enterprises retaining DDT production and use exemptions in order to effectively control environmental pollution and exposure to humans in DDT production and use.

3.3.6 Actions on specific exemptions

Action objective: Determine the POPs, listed in Annex A and Annex B under the Convention, that need to apply for specific exemptions.

Specific actions:

The State Environmental Protection Administration will, together with related departments, carry out evaluations of withdrawal or extension of specific exemptions:

- (1) Notify the Secretariat of the Convention about withdrawing specific exemptions for the production and use of hexachlorobenzene;
- (2) Evaluate the necessity of applying for an extension of exemptions for the production and use of chlordane and mirex; and
- (3) Evaluate the necessity of applying for an extension of the exemption for the production and use of DDT as a non closed-system intermediate in dicofol production.

3.3.7 Actions to reduce and eliminate releases of unintentionally produced POPs²⁶

Objectives:

- By 2008²⁷, begin to establish a management system enabling effective implementation of BAT/BEP in key industries with unintentionally produced POPs, realize the application of BAT to new sources in key industries and promote BEP.
- By 2010, complete the demonstration of release reduction for a portion of existing sources in key industries.
- By 2015, create a mechanism for ongoing monitoring and data reporting for release sources in key industries.
- By 2015, implement BAT/BEP in key industries and begin to rein in the upward trend of Dioxin releases.

Gaps in Convention implementation:

- Information about enterprises with release sources and data from actual monitoring of release intensity are inadequate, and the mechanism for data collecting and reporting on release sources and quantities and an ongoing inventory database system have not yet been established;
- At present, no systematic practice regarding reduction of unintentionally produced POPs releases has been carried out in China, resulting in a lack of relevant experience;

²⁶ Action plans for unintentionally produced POPs listed in Annex C emphasize reduction of Dioxin releases. Generally, reduction of Dioxin releases can also effectively reduce releases of unintentionally produced hexachlorobenzene and PCBs.

²⁷ The specific time will be adjusted subject to the time of approving the BAT/BEP guidelines by the Conference of the Parties.

- The management requirements of the Convention on new sources have not been integrated in the current management system, and corresponding technical specifications and emission standards are not complementary and systematic;
- Policies, laws and standards for the control of existing sources are insufficient; and
- A long-term effective mechanism for pollution control and continued reduction of unintentionally produced POPs needs to be established.

Co-benefits: Propel cleaner production and promote development of the cyclic economy; promote industrial structure adjustment and accelerate phaseout of the unfit; promote technology upgrading of enterprises and enhance corporate image and competitiveness; reduce the content of Dioxin in products and overcome “green” barriers in international trade; realize simultaneous reduction in releases of other pollutants and improve environmental quality; enhance China’s capacity for environmental monitoring; and promote the development of the environmental protection industry.

I. Measures and actions to control new sources of unintentionally produced POPs

According to the guideline of “prevention first”, and through strict implementation of the environmental impact assessment system and supplementing and improving corresponding standards, guidelines and technology policies, adopt BAT for new sources in key industries in 2008. Specific objectives and activities are as follows.

Action 1: Evaluate the technical feasibility of applying BAT to new sources in key industries and begin to apply BAT by 2008

Action objective: Determine the level of control technology for new sources in key industries and specify requirements for BAT implementation.

Specific actions: The State Environmental Protection Administration and the National Development and Reform Commission will, together with related departments and industries, organize investigation and research of the technologies at home and abroad for controlling new release sources in Part II of Annex C of the Convention and analyze the technical and economic feasibility of their application in China.

Action 2: Improve the environmental impact assessment system for new sources in key industries by 2008

Action objective: Promulgate or revise documents on which the environmental impact assessment will be based (i.e., technical standards/specifications/guidelines) and effectively control Dioxin releases from new sources in key industries.

Specific actions:

- (1) In view of the *Planning of National Environment Protection Standards for the “Eleventh Five-Year Plan” Period* and its annex, the *List of National Environment Protection Standards Needing to be Revised for the “Eleventh*

Five-Year Plan” Period, the State Environmental Protection Administration will, together with related departments and industries: specify that control of Dioxin releases using BAT must be considered in environmental impact assessment for new, reconstruction and expansion projects, or planning projects for key industries; and set forth assessment methods in developing and revising the following technical guidance for environmental impact assessment, as shown in Table 3-1.

Table 3-1 **Technical guidance for environment impact assessment**

No.	Name of technical guidance for environment impact assessment	Requirement		Whether on the list
		Revision	Development	
1.	<i>Technical Assessment Guidance for Environment Impact Assessment of Construction Projects - General Principles</i>	✓		✓
2.	<i>Technical Guidance for Environment Impact Assessment of Planning – Industry</i>		✓	✓
3.	<i>Technical Guidance for Environment Impact Assessment – Metallurgy</i> (Note: Focus will be on sintering of iron ore, electric arc furnace and secondary non-ferrous metal)		✓	✓
4.	<i>Technical Guidance for Environment Impact Assessment – Papermaking</i> (Note: focus will be on chlorine bleaching)		✓	✓
5.	<i>Technical Guidance for Environment Impact Assessment – Secondary Metal Parks</i>		✓	✓

(2) In developing and revising the following technical standards and specifications, set forth specific product technical standards and technical specifications for release source facilities, and for equipment within them, relating to Dioxin control, and specify in a detailed manner the requirements for using BAT to control Dioxin releases, as shown in Table 3-2.

Table 3-2 **Technical standards or specifications recommended for revision or promulgation**

No.	Name of technical standards or specifications	Requirement		Whether on the catalogue
		Revision	Formulation	
1.	<i>Standard for Municipal Waste Incinerators (GB/T 18750-2002)</i>	✓		✓
2.	<i>Technical Specifications for Centralized Incineration Facility Construction for Hazardous Waste (HJ/T176-2005)</i>	✓		
3.	<i>Standard for Medical Waste Incinerators (GB19218-2003)</i>	✓		
4.	<i>Technical specifications for Centralized Incineration Facility Construction for Medical Waste</i>	✓		

(HJ/T177-2005)			
5.	<i>Technical Specifications (or Manual) for Sewage and Sludge Processing Facility and Sludge Processing Engineering</i> (Note: focus on sludge incineration)	✓	✓
6.	<i>Technical Specifications for Paper-Making Wastewater Purification</i> (Note: focus on chlorine bleach processing)	✓	✓
7.	<i>General Design Rules for Particulate Contamination Control Engineering</i>	✓	✓
8.	<i>General Design Rules for Gaseous Contamination Control Engineering</i>	✓	✓
9.	<i>General Design Rules for Bag-type Dust Removal Engineering</i>	✓	✓
10.	<i>Design Rules for Gaseous Contamination Control Engineering - Absorption Method</i>	✓	✓
11.	<i>Design Rules for Gaseous Contamination Control Engineering - Adsorption Method</i>	✓	✓
12.	<i>General Design Rules for Gaseous Contamination Control Engineering - Catalysis Method</i>	✓	✓
13.	<i>Technical Specifications for Bag-type Dust Removal for the Iron and Steel Industry</i>	✓	✓
14.	<i>Technical Specifications for Bag-type Dust Removal for Non-ferrous Metal Metallurgy</i>	✓	✓
15.	<i>Technical Specifications for Bag-type Dust Removal for Waste Incineration</i>	✓	✓
16.	<i>Technical Specification for Hazardous Waste Processing and Disposal Engineering</i>	✓	✓

(3) Integrate requirements such as BAT application, BEP promotion and the prevention and reduction of Dioxin releases in developing and revising the following technology policies, as shown in Table 3-3.

Table 3-3 **Technical policies recommended for revision or promulgation**

No.	Name of technical policy	Requirement		Whether on the catalogue
		Revision	Promulgation	
1.	<i>Technical Policies on Pollution Control in Municipal Waste Disposal</i>	✓		
2.	<i>Technical Policies on Hazardous Waste Pollution Prevention and Control</i>	✓		
3.	Technical Policies on Pollution Prevention and Control in Medical Waste Disposal		✓	
4.	Technical Policies on Iron and Steel Industrial Pollution Prevention and Control		✓	✓

5.	Technical Policies on Pollution Prevention and Control in Non-ferrous Metal Industry	✓	✓
----	--------------------------------------------------------------------------------------	---	---

Action 3: Revise the *Guiding Catalogue of Industrial Structure Regulation* by 2008

Action objective: Achieve Dioxin release reductions through making adjustments to the *Guiding Catalogue of Industrial Structure Regulation*.

Specific actions: The National Development and Reform Commission will, together with the State Environmental Protection Administration and related departments and industries, put key Dioxin release sources in the *Guiding Catalogue of Industrial Structure Regulation*. Sources required to be listed in the Category “Elimination” include small-scale, simplified, and out-of-date incinerators, paper mills and reverberatory furnaces used for secondary aluminum, copper and zinc, which are technologically outdated and liable to produce and release Dioxin. Sources planned to be listed in the Category “Limitation” include pulp production processes with elemental chlorine or chemicals possibly producing elemental chlorine as bleaching agents. Sources planned to be listed in the Category “Encouragement” include complete incineration equipment and quencher facilities and desulphurization and denitration equipment used for sinterers which have been practically proven to produce less Dioxin releases, as well as processes and equipment identified by the BAT/BEP guidelines.

Action 4: Establish and improve release standards for new sources in key industries by 2010

Action objective: Establish and improve release standards for new sources in key industries and include Dioxin in pollution control indicators.

Specific Actions:

- (1) The State Environmental Protection Administration will, together with related departments and industries, organize the conduct of a study on the Dioxin reduction achieved by the application of BAT, and conduct a feasibility study on developing emission standards for new sources, giving consideration to the extent of industrial development and the current actual situation of China
- (2) In view of the *List of National Environment Protection Standards Needing to be Revised for the “Eleventh Five-Year Plan” Period*, complement and revise control indicators for new sources of Dioxin in developing and revising technical standards and specifications as listed in Table 3-4, including studying the development of dioxin standards for: air emission and fly ash of new sources of sludge incineration in water treatment; wastewater of new sources of pulp production facilities using elemental chlorine or chemicals capable of producing elemental chlorine as bleaching agents; new sources of the three types of secondary metals (secondary copper, secondary aluminum and secondary zinc); air emission from new sources of iron ore sintering; and air emission from new sources of electric arc furnace steelmaking.

Table 3-4 National standards on release (control) of pollutants

No.	Name of standard	Requirement		Whether on the catalogue
		Revision	Development	
1.	<i>Standards for Municipal Waste Incineration Pollution Control</i> (GB18485-2001)	✓		✓
2.	<i>Standards for Hazardous Waste Incineration Pollution Control</i> (GB18484-2001)	✓		✓
3.	Standards for Cement Kiln Industrial Solid Waste (Including Industrial Toxic Waste) Pollution Control		✓	✓
4.	Standards for Pulp and Paper-making Industrial Pollutants Discharge (Note: emphasizing pulp and paper-making procedures with chlorine bleaching)		✓	
5.	Standards for Iron and Steel Industrial Pollutants Discharge (Note: emphasizing the process of iron ore sinter and steel making with electric arc furnace)		✓	
6.	Standards for Recycled Non-ferrous Metal Industrial Environment Control – Copper		✓	✓
7.	Standards for Recycled Non-ferrous Metal Industrial Environment Control – Aluminum		✓	✓
8.	Standards for Recycled Non-ferrous Metal Industrial Environment Control – Zinc		✓	✓

II. Establish ongoing inventories of dioxin releases in key industries

Action 5: Establish and strengthen the national capacity for Dioxin monitoring

Specific actions: Establish dioxin laboratories, implement a laboratory assessment and certification system and strengthen the national monitoring capacity for Dioxin so as to monitor key release sources in an oversight manner and to provide technical support for the nationwide investigation of Dioxin pollution and the work of environmental management.

Specific actions:

- (1) The State Environmental Protection Administration will, together with the Ministry of Science and Technology, organize the building and upgrading of Dioxin laboratories of relevant departments. The Ministry of Health will, together with the Ministry of Science and Technology, organize the building and upgrading of the five Dioxin network laboratories listed in the *Food Safety Action Plan* and, based on metrology accreditation and national laboratory certification, establish a system for the assessment and certification of Dioxin monitoring capacity by means of regularly organizing laboratory comparison activities; and encourage the participation of environmental analysis laboratories from the colleges, universities, research institutes and enterprises with Dioxin monitoring capacity;
- (2) Taking into consideration the *List of National Environmental Protection*

Standards That Should Be Revised during the Period of “11th Five-Year” Plan, develop or revise the following standards on methods for Dioxin monitoring, shown as in Table 3-5.

Table 3-5 Standards on methods for dioxin monitoring to be developed or revised

No.	Name of standard	Requirement		Whether on the catalogue
		Revision	Development	
1	Air and Exhaust Air - PCDD/Fs Measurement Isotope Dilution/HR Gas Chromatography- HR Mass Spectrometry Method		✓	✓
2	Air and Exhaust Air - PCDD/Fs Measurement Biology Screening Method		✓	✓
3	Water Quality- PCDD/Fs Measurement Isotope Dilution/HR Gas Chromatography- HR Mass Spectrometry Method		✓	✓
4	Water Quality - PCDD/Fs Measurement Biology Screening Method		✓	✓
5	Soil Sediments - PCDD/Fs Measurement Isotope Dilution/HR Gas Chromatography- HR Mass Spectrometry Method		✓	✓
6	Soil Aggradations - PCDD/Fs Measurement Biology Screening Method		✓	✓
7	Solid Waste - PCDD/Fs Measurement Isotope Dilution/HR Gas Chromatography- HR Mass Spectrometry Method		✓	✓
8	Solid Waste - PCDD/Fs Measurement Biology Screening Method		✓	✓

Action 6: Establish inventories of Dioxin releases countrywide by 2010

Action objective: Carry out in-depth investigation of Dioxin release sources countrywide and develop relatively complete inventories of Dioxin release sources by 2010.

Specific actions: The State Environmental Protection Administration will, together with related departments and industries, organize and carry out investigation of Dioxin release sources countrywide by region, industry and stage, giving consideration to plans for Convention implementation.

Action 7: Accomplish the systematic monitoring of Dioxin releases in key industries by 2015

Action objective: By means of systematic monitoring, correction and improvement of release factors for Dioxin, complete the inventories of Dioxin releases in key industries so as to provide a scientific basis for work on release reductions.

Specific actions: The State Environmental Protection Administration will, in combination with demonstration activities for Convention implementation, organize: systematic monitoring by industries of typical release sources of different scale, process equipment, pollution control facilities and level of management in key

industries; the correction and improvement of release factors for sources in key industries; and the completion of inventories of Dioxin releases in key industries.

Action 8: Establish a mechanism for the ongoing monitoring and data reporting of releases in key industries by 2015

Action objective: Establish a mechanism for the ongoing monitoring and data reporting of release sources, so as to provide support for establishment of the dynamic inventories of Dioxin release sources, data reporting, performance evaluation and macro-decision making.

Specific actions: Clearly specify the rights and obligations of parties related to information channels in terms of establishing a mechanism for the gathering and reporting of ongoing information on release sources; and organize the building of China's Dioxin dynamic database system to store and analyze ongoing changes in the release inventories.

III. Actions to reduce and control existing release sources

Action 9: Give priority to carrying out BAT/BEP application demonstration activities at the enterprise level in present key industries

Specific actions: Through the Dioxin release reduction demonstration with BAT/BEP application as a means for key release sources, study the technical and economic feasibility of BAT/BEP under the national conditions of China to accumulate experience and provide a reference for subsequent promotion.

Specific actions: The State Environmental Protection Administration will, together with the National Development and Reform Commission, the Ministry of Construction, the Ministry of Health and other departments concerned, give priority to the following demonstration activities based on actual resources available: environmentally sound management and disposal of municipal wastes; environmentally sound management and disposal of hazardous wastes; environmentally sustainable management of medical wastes; chlorine-free pulping; release reduction in the steel industry, the secondary metal industry, the funeral and interment (cremation machines) industry and the chemical industry as well as technological renovation aiming at Dioxin release reduction; and formulate release reduction plans for key industries by taking into consideration the soil load of Dioxin and population risk resulting from releases in the key industries, and relevant local plans.

Action 10: Improve the cleaner production standards or cleaner production audit guidelines for key industries, and promulgate BAT/BEP guidance for key industries by 2010.

Action objective: Through the summary and analysis of data and information from BAT/BEP application by typical enterprises in the key demonstration industries, and based on the needs of BAT/BEP application, establish cleaner production standards and cleaner production audit guidelines for existing sources and promulgate BAT/BEP guidance for key industries in China.

Specific actions: The State Environmental Protection Administration will, together with departments concerned: list Dioxin-containing wastes and the sources in key industries in the *List of Toxic and Hazardous Substances Required to Be Audited*, and in combination with the *List of National Environmental Protection Standards That Should Be Revised during the Period of “11th Five-Year” Plan*, include the adoption of BAT/BEP and the control of Dioxin into the cleaner production standards and audit guidelines; formulate the cleaner production standards or cleaner production audit guidelines integrating existing experience in BAT/BEP application for the sources of key industries (cleaner production standards or cleaner production audit guidelines that need to be formulated are shown in Table 3-6); and formulate BAT/BEP guidance for China on the sources of key industries.

Table 3-6 **Cleaner production standards or cleaner production audit guidelines to be developed**

No.	Name of standard	Requirement		On the list or not
		Revision	Development	
1	Cleaner Production Standard – Procedure and Method for Compulsory Cleaner Production Audit		✓	✓
2	Cleaner Production Standard – Assessment Method for Compulsory Cleaner Production Audit		✓	✓
3	Cleaner Production Standard – Paper-making Industry (Pulp making with waste paper)		✓	✓
4	Cleaner Production Standard – Secondary Non-ferrous Metal Industry (including secondary copper, secondary aluminum, secondary lead and secondary zinc)		✓	
5	Cleaner Production Standard – Iron and Steel Industry (Note: Focus is placed on iron ore sintering and steelmaking electric arc furnace)		✓	✓
6	Cleaner Production Audit Guideline – Paper Making Industry (pulp making with waste paper)		✓	✓
7	Cleaner Production Audit Guideline – Iron and Steel Industry (Note: Focus is placed on iron ore sintering and steelmaking with electric arc furnace)		✓	✓
8	Cleaner Production Audit Guideline – Secondary Non-ferrous Metal Industry		✓	

Action 11: Begin to establish and improve standards for Dioxin releases from existing sources in key industries by 2010

Action objective: Begin to establish and improve release standards for existing sources in key industries and include Dioxin in pollution control targets.

Specific action: The State Environmental Protection Administration will, together with related departments, organize and carry out the study of levels of Dioxin releases that BAT/BEP can achieve and, in combination with China’s present industrial development as well as with its actual national conditions, conduct a feasibility study on the establishment and improvement of release standards for

existing sources. In the formulation and revision of the standards shown in Table 3-7, the control targets for existing Dioxin release sources will be complemented and revised by comparing with the *List of National Environmental Protection Standards That Should Be Revised during the Period of “11th Five-Year” Plan*.

Table 3-7 Standards for the release/control of pollutants from existing sources in key industries of the country that should be developed or revised

No.	Name of standard	Requirement		Whether on the catalogue
		Revision	Development	
1.	<i>Standards for Municipal Waste Incineration Pollution Control</i> (GB18485-2001)	✓		✓
2.	<i>Standards for Toxic Waste Incineration Pollution Control</i> (GB18484-2001)	✓		✓
3.	Standards for Cement Kiln Industrial Solid Waste (Including Industrial Toxic Waste) Pollution Control		✓	✓
4.	Standards for Recycled Non-ferrous Metal Industrial Environment Control –Copper		✓	✓
5.	Standards for Recycled Non-ferrous Metal Industrial Environment Control –Aluminum		✓	✓
6.	Standards for Recycled Non-ferrous Metal Industrial Environment Control –Zinc		✓	✓
7.	Standards for Pulp and Paper-making Industrial Contamination Discharge (Note: emphasizing pulp and paper-making procedures with chlorine bleaching)		✓	
8.	Standards for Iron and Steel Industrial Contamination Discharge (Note: emphasizing the process of iron ore sinter and steel making with electric arc furnace)		✓	
9.	Cremation Machine Pollutant Release Standards		✓	

Action 12: Accomplish the first stage of work in promoting BAT/BEP in existing key industries by 2015.

Action objective: Gradually reduce Dioxin releases in existing key industries²⁸, and begin to control the upward trend in Dioxin releases.

Specific actions: Together with the National Development and Reform Commission and related departments and industries, the State Environmental Protection Administration will, based on the release reduction plans for key industries worked out by demonstration activities, promote BAT/BEP for municipal waste incineration, hazardous waste incineration, medical waste incineration, pulping and papermaking, iron ore sintering, steelmaking with electric arc furnace, secondary non-ferrous metal, funerals and interment (cremation machines), and key areas in the chemical industry – which are determined in the release reduction plans – and, through the reduction of Dioxin releases in existing key industries, accomplish control of the upward trend in

²⁸ With reference to the situation in 2004.

Dioxin releases.

Action 13: Further revise the cleaner production standards and cleaner production audit guidelines on existing sources in key industries, as well as BAT/BEP guidance for the key industries of China, by 2015.

Action objective: Based on the experience summarized from the first stage of BAT/BEP promotion in key industries, and according to the needs for BAT/BEP application, further revise the cleaner production standards and cleaner production audit guidelines for existing key industries, as well as BAT/BEP guidance for key industries.

Specific actions: The State Environmental Protection Administration will, together with related departments and industries: summarize and analyze the data and information on the first stage of BAT/BEP promotion in key industries, including release reduction results, investment costs, operating costs, implementation efficiency, etc.; revise the cleaner production standards and cleaner production audit guidelines as listed in Table 3-6; and revise the BAT/BEP guidance for key industries.

Action 14: Further revise the release standards for existing sources in key industries by 2015.

Action objective: Further improve the release standards for existing sources in key industries, making the control targets for Dioxin releases from sources in key industries more consistent with the level that China can achieve through BAT/BEP.

Specific actions: The State Environmental Protection Administration will, together with related departments and industries, analyze the release reduction results, investment costs, operating costs, implementation efficiency, etc., of the first stage of BAT/BEP promotion activities in industries, evaluate the rationality of the release standards on existing sources, and revise related release standards, starting from the national conditions and based on the BAT/BEP application results as well as the current industrial and technological development levels.

Action 15: Accomplish the second stage of BAT/BEP promotion for existing sources in key industries by 2025

Action objective: Accomplish nationwide BAT/BEP promotion for existing sources in key industries so as to reduce Dioxin releases, according to relevant cleaner production standards or specifications.

Specific actions: The State Environmental Protection Administration will, together with related departments and industries, summarize the experience and lessons drawn from the first stage of BAT/BEP promotion and promote BAT/BEP in municipal waste incineration, hazardous waste incineration, medical waste incineration, pulping and papermaking, iron ore sintering, steelmaking with electric arc furnace, secondary non-ferrous metal, funerals and interment (cremation machines) and the chemical industry.

IV. Continued release reduction and control of unintentionally produced POPs

Action 16: Establish a mechanism for the periodic evaluation and updating of unintentionally produced POPs release reduction and control strategies and of implementation effectiveness.

Action objective: Maintain the effectiveness of unintentionally produced POPs release reduction and control strategies so as to ensure the effectiveness of release reduction.

Specific actions: The State Environmental Protection Administration will, together with related departments and industries: perform an evaluation of the strategies and their implementation results every five years; based on evaluation results and taking into consideration the latest release reduction experience in the world, adjust and improve the strategies, making them more adaptive to the actual conditions of industrial development and technological advancement and consistent with requirements of release reduction in a new period; report to the Conference of the Parties the evaluation results as part of the effectiveness evaluation of the National Implementation Plan; and, meanwhile, improve on a continuing basis the data reporting system formed in the process of demonstration and replication programs.

Action 17: Gradually establish and improve a policy guiding mechanism for the release reduction and control of unintentionally produced POPs

Action objective: Establish and improve a long-term, effective mechanism for the continued release reduction and control of unintentionally produced POPs.

Specific actions: The State Environmental Protection Administration will, together with related departments and industries, perform overall evaluation of the whole process of the release reduction and control in key industries, and:

- (1) update inventories of unintentionally produced POPs;
- (2) adjust and update inventories of key industries, taking into consideration the development of international BAT/BEP guidance;
- (3) promote existing BAT/BEP in newly identified key industries;
- (4) encourage enterprises to participate in the G/BT19000-ISO9000 series of quality management system certification and the GB/524000-ISO14000 series of environmental management system certification, so as to improve their level of environmental management;
- (5) encourage enterprises to take voluntary release reduction actions on the source categories listed in Annex C under the Convention, and establish an incentive mechanism;
- (6) include Dioxin releases in the indicators for performance appraisal of environment-friendly enterprises;
- (7) strengthen enforcement so as to phase out outdated production processes and equipment and to close down relevant illegal enterprises;
- (8) conduct publicity and training at national, regional and local levels, and implement integrated thoughts and implementation methods for the release reduction of unintentionally produced POPs; and
- (9) use the ideas and experience from Dioxin release reduction to promote the

release reduction of unintentionally produced HCB and unintentionally produced PCBs.

3.3.8 Actions and measures to reduce releases from POPs stockpiles and wastes

Objective: Improve the national capacity for the environmentally sound management and disposal of POPs stockpiles and wastes, identify POPs stockpiles and wastes across the country, and implement environmentally sound management and disposal to reduce releases originating from POPs stockpiles and wastes.

Gaps in Convention implementation:

- The existing legal and regulatory system for environmental protection for hazardous wastes is still incomplete, lacking identification criteria for POPs wastes as well as specifications related to POPs stockpile management and the environmentally sound management and disposal of wastes;
- Capacity for POPs stockpile management and the environmentally sound management and disposal of wastes is inadequate.

Co-benefits: Strengthen the national capacity for the environmentally sound management and disposal of hazardous wastes, and promote the development of the environmental protection industry regarding the environmentally sound disposal of hazardous wastes.

Action 1: Improve the system for the environmentally sound management of POPs wastes

Action objective: Improve the system for the environmentally sound management of POPs wastes by 2010.

Specific actions: Together with related departments, the State Environmental Protection Administration will:

- (1) study and develop identification criteria for POPs wastes and include these criteria in the system of identification criteria for hazardous wastes, by referring to Basel Convention and taking into consideration the actual conditions of China;
- (2) revise the *National Catalogue of Hazardous Wastes* and list sources of POPs wastes containing Dioxin;
- (3) improve information management for POPs stockpiles and wastes, in particular POPs wastes left over historically by closed, suspended and bankrupt enterprises; carry out a study of the system of information collection; and establish relevant incentive, reporting, audit and registration systems;
- (4) develop and improve management measures with regard to the import and export of POPs wastes; and
- (5) establish the technical codes system for the environmentally sound management and disposal of POPs wastes, including: revision of the *Technology Policy for the Prevention and Control of Pollution Caused by Hazardous Wastes*, defining that POPs wastes may not be reclaimed, recycled, regenerated or directly reused; develop the *Technical Specification on Co-Processing of Hazardous Wastes in Cement Kilns*; revise the *Pollution Control Standard for Hazardous Wastes Incineration* and *Standard for*

Pollution Control on Hazardous Waste Storage; and develop the Technical Guidance for Emergency Response to Pollution Events Caused by Hazardous Wastes, etc.

Action 2: Strengthen the capacity of relevant institutions for the environmentally sound management of POPs stockpiles and wastes

Action objective: Improve the environmentally sound management of POPs stockpiles and wastes by 2010.

Specific actions: Together with related departments, the State Environmental Protection Administration will:

- (1) establish a management coordination mechanism and strengthen law enforcement, specifically by: inspecting and supervising the implementation by relevant enterprises of the regulations on POPs-like hazardous chemicals, pesticides and hazardous wastes, etc. regarding collection, packaging, storage, transfer, import and export, etc.; having in hand updated information on POPs stockpiles and wastes, and effectively controlling their transfer and pollution diffusion; and enhancing the testing and identification capacity regarding the import and export of wastes for resource recovery purposes, so as to put an end to the import of these POPs wastes;
- (2) strengthen the capacity of the solid waste management centers at the national and provincial levels, including the allocation of personnel and facilities; and
- (3) carry out publicity and training regarding management awareness and skills for the personnel of national and local environmental protection departments involved in POPs wastes management, and strengthen their capacity for the enforcement and supervision of the environmentally sound management and disposal of POPs wastes.

Action 3: Improve capacity for the environmentally sound disposal of POPs

Action objective: Introduce and develop technologies for the environmentally sound disposal of POPs, carry out demonstration activities and improve disposal capacity, by 2010.

Specific actions:

- (1) The State Environmental Protection Administration will organize the introduction of foreign advanced technologies for the environmentally sound disposal of POPs wastes and assist the Ministry of Science and Technology in development of innovative technologies;
- (2) The State Environmental Protection Administration will, together with departments concerned, organize the construction of disposal facilities and conduct the environmentally sound disposal of POPs wastes in combination of *Construction Program for Disposal Facilities of Countrywide Hazardous Wastes and Medical Wastes*.

Action 4: Implement, and adjust on a timely basis, the plans for the environmentally sound disposal of POPs wastes

Action objective: Gradually complete the environmentally sound disposal of POPs

wastes so as to prevent environmental pollution.

Specific actions: The State Environmental Protection Administration will, together with related departments, organize the following activities.

- (1) Adopt the high-temperature incineration and cement kiln technologies, which have currently been in operation and are relatively mature, as well as other international mature technologies such as non-incineration, and gradually carry out the environmentally sound disposal of identified pesticide POPs wastes by choosing, rationally, disposal technologies and facilities, to complete disposal of 30% of the total amount identified by 2010, and the remaining 70% by 2015;
- (2) Apply high-temperature incineration, thermal desorption or other technologies (subject to the concentration of PCBs) to carry out gradually the environmentally sound management and disposal of identified PCBs-containing wastes, based on results gained in improving the national PCBs-containing waste inventories; achieve the environmentally sound disposal of PCBs-containing wastes in demonstration provinces by 2010; complete the environmentally sound disposal of high-risk, PCBs-containing wastes listed in the first stage of inventories (subject to validation after the environmental risk evaluation of the sealed status of PCBs wastes and the operating conditions of PCBs-containing equipment in use) by 2015; complete the environmentally sound disposal of high-risk, PCBs-containing wastes listed in the second stage of inventories (including all equipment with PCBs content over 0.05% currently in use) by 2025; and complete the environmentally sound disposal of all PCBs-containing wastes listed in the third stage of inventory (including all equipment found with PCBs content over 0.005% currently in use) by 2028²⁹;
- (3) Achieve the environmentally sound management and disposal of identified Dioxin-containing wastes in key industries by 2015;
- (4) As for unidentified POPs wastes, based on the inventory investigation results in section 3.3.9, adjust the existing action plans for the environmentally sound disposal of wastes, if necessary.

3.3.9 Strategies to identify POPs stockpiles, articles in use and wastes

Objective: Develop relevant strategies, identify POPs stockpiles, articles in use and wastes in China, and improve the POPs information management system.

Gaps in Convention implementation:

- Further investigation of pesticide POPs wastes still needs to be carried out, and relevant inventories need to be improved;
- Strategies for identifying PCBs-containing wastes are not yet complete and basic data are relatively weak;
- Information on Dioxin wastes is severely insufficient; and
- The information management system for POPs stockpiles and wastes is not well established.

²⁹ Please refer to Action 3 of Section 3.3.9 for the list of inventories of PCBs waste of the first, second and third stages.

Co-benefits: Improve the state's understanding of the existing conditions of pesticide POPs wastes, PCBs-containing electrical equipment in use and obsolete equipment containing PCBs; promote the environmentally sound management and disposal of POPs wastes, particularly PCBs-containing wastes, and elevate the state's overall environmental management level on hazardous wastes.

Action 1: Improve the ongoing database system for POPs stockpiles and wastes

Action objective: Improve the ongoing database system for POPs stockpiles and wastes.

Specific actions: Together with related departments, the State Environmental Protection Administration will organize and carry out the following activities:

- (1) By 2010, improve database subsystems for POPs stockpiles, wastes and contaminated sites within the framework of information systems pursuant to the requirements for information collection, processing and reporting, and encourage the strengthening of information management in regions with more advanced conditions.

Action 2: Identify pesticide POPs stockpiles and wastes

Action objective: Complete the updating of inventories of pesticide POPs stockpiles and wastes.

Specific actions: The State Environmental Protection Administration will organize and carry out the following activities:

- (1) By 2010, on the basis of existing preliminary inventories, complete the field investigation and monitoring of identified pesticide POPs stockpiles and wastes, complete the field investigation and monitoring of unidentified POPs stockpiles and wastes in pilot provinces, and update the inventory of pesticide POPs stockpiles and wastes in China.
- (2) By 2015, complete the investigation and monitoring of pesticide POPs stockpiles and wastes, in particular, the investigation into the pesticide stockpiles and wastes in production enterprises and in the area of distribution, and improve the inventories of pesticide POPs stockpiles and wastes in China.

Action 3: Identify wastes containing PCBs

Action objective: Complete the updating of inventories of PCBs wastes.

Specific actions: Together with the State Electricity Regulatory Commission, the State Environmental Protection Administration will carry out the following activities.

- (1) By 2010, evaluate the status of the environmentally sound management and disposal of PCBs-containing wastes listed in the preliminary inventories (including those sealed up and temporarily stored) and, taking into consideration the results from identification and evaluation of the operating condition of PCBs-containing equipment currently in use, determine and generate the first stage countrywide inventory of PCBs-containing wastes, including PCBs-containing wastes validated to be further managed and disposed of in an environmentally sound way through the evaluation at this

stage and PCBs-containing equipment currently in use validated to be scrapped and disposed of through the identification and evaluation.

- (2) By 2015, evaluate and validate on a continuing basis the PCBs wastes (those sealed up and temporarily stored) that are not effectively managed and disposed of in an environmentally sound way and, by taking into consideration the results from the identification and evaluation of PCBs-containing electrical equipment currently in use, further determine and generate the second stage countrywide inventories of PCBs-containing wastes, including all equipment in use with PCBs content over 500 ppm and with capacity greater than 5L (for which PCBs will be eliminated or the environmentally sound disposal of equipment will be conducted pursuant to the action plan under section 3.3.4).
- (3) By 2025, taking into consideration the evaluation results on the status of the environmentally sound management and disposal of PCBs-containing wastes, as well as the final results from the identification and evaluation of PCBs-containing equipment currently in use, determine and generate the third stage nationwide inventories of PCBs-containing wastes, including all types of equipment or articles in use with PCBs content over 50 ppm (for which PCBs will be eliminated or the environmentally sound disposal of equipment will be conducted pursuant to the action plan under section 3.3.4).

Action 4: Identify wastes containing Dioxin

Action objective: Accomplish the updating of inventories of dioxin-like POPs wastes.

Specific actions: The State Environmental Protection Administration will, together with related departments, carry out the following activities:

- (1) By 2015, on the basis of the inventories of Dioxin releases and the relevant investigation results, choose the controllable sources of generation of key dioxin wastes to begin to establish an information system on the declaration of dioxin-like wastes; and
- (2) Based on the information system on the declaration of dioxin-like wastes, begin to establish ongoing inventories of Dioxin wastes.

3.3.10 Actions and measures to properly manage POPs stockpiles and dispose of articles containing POPs in use

Objective: Exercise effective supervision and management of pesticide POPs stockpiles, conduct proper management and maintenance of PCBs-containing electrical equipment to be used, and undertake the environmentally sound management of the PCBs-containing electrical equipment in stock that is validated to be scrapped.

Gaps in Convention implementation:

- Enterprises that produce, distribute and use pesticide-like POPs still need to strengthen the supervision and management of POPs stockpiles;
- Products and articles in use containing POPs have not yet been completely identified, and POPs content and pollution have not been effectively restrained; and
- There is a lack of proper management and disposal for PCBs-containing equipment in stock.

Co-benefits: Improve the level of supervision and management of high-risk chemicals and pesticides, rigorously enforce quality control standards on relevant products, enhance the environmental and safety awareness of producers and users of related products, and promote environmental and health risk control in relevant areas of distribution.

Action 1: Appropriate management of POPs stockpiles

Action objective: Rigorously control and appropriately dispose of identified POPs stockpiles as soon as possible.

Specific actions:

- (1) The State Environmental Protection Administration will, together with related departments: implement rigorous supervision and environmentally sound management measures for identified POPs stockpiles and their storage conditions to prevent their unexpected loss, physical exposure and environmental pollution; and implement, as soon as possible, the environmentally sound disposal of them as POPs wastes, except for special purposes.

Action 2: Identify and effectively manage products or articles in use containing pesticide-like POPs

Action objective: Investigate products and articles in use containing pesticide-like POPs and take measures for the control of POPs releases by taking into consideration the circumstances.

Specific actions: The State Environmental Protection Administration will, together with departments concerned, take the following actions:

- (1) Conduct complete investigation and identification of products or articles in use containing pesticide-like POPs, and evaluate the content of pesticide-like POPs; and.
- (2) Based on the above-mentioned investigation results, conduct research on appropriate POPs release control measures for products or articles in use containing pesticide-like POPs.

Action 3: Appropriately manage and dispose of PCBs-containing electrical equipment in stock

Action objective: Appropriately manage PCBs-containing electrical equipment in stock so as to control its environmental risks.

Specific actions:

- (1) The State Electricity Regulatory Commission will, together with the State Environmental Protection Administration, and in cooperation with related industrial associations, conduct the evaluation and clean-up of PCBs-containing electrical equipment in stock and, taking into consideration the environmentally sound management and disposal plans for PCBs-containing wastes, undertake in time the environmentally sound

management and disposal of PCBs-containing electrical equipment in stock that is validated to be scrapped.

- (2) The State Electricity Regulatory Commission will, in cooperation with related industrial associations, conduct appropriate management and maintenance of PCBs-containing electrical equipment in stock to prevent leakage of PCBs, pursuant to the environmental management systems and specifications on maintenance, and operation of PCBs-containing electrical equipment currently in use as set forth in section 3.3.4.

3.3.11 Strategies for the identification and environmentally sound management of POPs contaminated sites

Objective: Establish a regulatory system for the environmentally sound management of POPs contaminated sites, conduct the identification and risk evaluation of POPs contaminated sites, and develop strategies for the environmentally sound management of POPs contaminated sites.

Gaps in Convention implementation:

- Lack of identification standards and risk evaluation standards for POPs contaminated sites;
- Lack of laws and regulations pertaining to the environmentally sound management of POPs contaminated sites;
- Indefinite mechanism for the environmentally sound management of POPs contaminated sites; and
- Lack of economic and technological policies for the environmentally sound management of POPs contaminated sites.

Co-benefits: Enhance awareness of the environmental and health risks of POPs contaminated sites, improve the environmental evaluation and management levels with regard to the utilization of state-owned land, and promote the implementation of preventive measures for the risks involved as well as the environmental safety of the state as a whole.

Action 1: Establish an environmentally sound management system for POPs contaminated sites and soils

Action objective: Improve the environmentally sound management level of POPs contaminated sites.

Specific actions: The State Environmental Protection Administration will, together with related departments:

- (1) By 2010, research and formulate identification standards for POPs contaminated sites appropriate to the national conditions of China; develop ecological risk evaluation standards on POPs contaminated sites; and begin to establish an information collection system for POPs contaminated sites.
- (2) By 2015, evaluate and analyze the existing regulatory system for land resources utilization and soil pollution prevention and control, as well as the functions of concerned management institutions; research and establish the institutional and regulatory systems for the environmentally sound management and remediation of POPs contaminated sites; and develop and

promulgate the *Measures for Environmental Management of Contaminated Sites*, the *Law on Prevention and Control of Soil Pollution*, technical policies and standard specifications on the remediation of POPs contaminated sites, etc.

- (3) By 2015, enhance the capacity of related management institutions for the supervision and management of POPs contaminated sites, and strengthen the environmentally sound management of POPs contaminated sites.

Action 2: Develop and implement strategies for the identification of POPs contaminated sites

Action objective: Establish relatively complete inventories of POPs contaminated sites.

Specific actions: The State Environmental Protection Administration will, together with related departments, take the following measures.

- (1) By 2015, conduct identification of pollution at 40 undetected contaminated sites out of 44 identified possible pesticide-like POPs contaminated sites, detect newly found contaminated sites, and establish relatively complete inventories of pesticide-like POPs contaminated sites.
- (2) By 2010, according to existing investigation information on PCBs wastes, as well as the results from auditing the first batch of provinces selected, establish a preliminary inventory of PCBs contaminated sites; conduct, on a continuing basis, the monitoring of PCBs contaminated sites, and establish an inventory of PCBs contaminated sites in China by 2020.
- (3) By 2015, on the basis of existing investigation and monitoring results on Dioxin-like pollution sources, begin to establish an identification and statistical system for Dioxin-like contaminated sites, conduct the monitoring of Dioxin-like contaminated sites, and establish an ongoing inventory of Dioxin-like contaminated sites.

Action 3: Develop strategies for the environmentally sound remediation of POPs contaminated sites

Action objective: Develop strategies for the environmentally sound remediation of POPs contaminated sites **by 2020**.

Specific actions: The State Environmental Protection Administration will, together with related departments:

- (1) Develop a long-term action plan for the environmentally sound remediation of POPs contaminated sites according to investigation results on POPs contaminated sites;
- (2) Conduct risk evaluations of POPs contaminated sites and determine priorities for risk management; and
- (3) Launch, as appropriate, a demonstration on remediation of contaminated sites.

3.3.12 Promote information exchange for concerned parties

Action objective: Enhance the information management capacity of the Convention Implementation Office, and begin to build an information exchange platform by 2007.

Specific actions:

- (1) Strengthen the capacity of the Convention Implementation Office for information management in combination with institutional and capacity building, the establishment of a POPs inventory, and the building of a management information system relating to POPs;
- (2) Run the management information system for POPs; collect, sort and process relevant domestic basic information; track the behavior of enterprises relating to POPs; and follow-up the implementation of Convention implementation projects and the development and implementation of relevant policies, plans and strategies;
- (3) In combination with the implementation of the declaration and registration system for POPs releases, submit to the Secretariat of the Convention the information required by the Convention to be declared and reported regarding POPs production, use, release, etc., and maintain smooth information exchange with other parties to the Convention;
- (4) Give publicity to POPs knowledge and progress in Convention implementation and policies via the established website *China's POPs Actions for Convention Implementation* (www.china-pops.org), and release relevant information on Convention implementation as one of the major institutions that disclose national information on POPs;
- (5) Encourage industrial departments to use network resources to disseminate and release relevant information;
- (6) Regularly organize the forum on implementation of the Stockholm Convention to facilitate the exchange and communication between the government, related enterprises and the public, and to disseminate experience in Convention implementation; and
- (7) Compile and publish scientific research findings and summaries of practice and experience relating to the implementation of the Convention, as well as relevant materials and information.

3.3.13 Public information, awareness and education

Action objective: Build hierarchically and by regions the platforms and long-term effective mechanisms for publicity and education on Convention implementation; make an effort to increase public awareness in different regions by 2015; achieve a 60% rate of public awareness in regions with priority given to environmental protection³⁰ as well as in regions where POPs releases are relatively intensive³¹; and improve the capacity of the public to participate in decision making with regard to environmental protection.

Specific actions:

- (1) Develop public awareness, educational and training programs, taking into consideration the *Outline of National Actions on Environmental Awareness and Education*;

³⁰ : With reference to the *Decision of the State Council on Strengthening Environment Protection*, these regions have limited environmental capacity and insufficient natural resources, but are economically better developed.

³¹ Periphery of industries which produce POPs intentionally or use POPs; periphery of POPs waste sites; areas with relatively high emission of Dioxins.

- (2) Develop public awareness, educational and training materials:
 - a) Produce TV programs and compile and publish readings suitable for different groups, to provide knowledge of hazards of POPs, sources of POPs, protective measures against POPs hazards, behavior of POPs in the environment, processes and technologies for controlling POPs, environmentally sound substitutes/alternative technologies, relevant policies and regulations, etc.;
 - b) Publish a series of information on progress in Convention implementation on the website, *China's POPs Actions for Convention Implementation* (www.china-pops.org), and in newspapers or other mass media;
- (3) Decision making levels and administrative departments: in combination with the building of institutional capacity, conduct training of both central and local policy makers and decision makers regarding Convention implementation requirements and countermeasures, aiming at enhancing their capacity for decision making and management on POPs;
- (4) Industry and technical support organizations:
 - a) Conduct, by industries and by regions, the forums on POPs substitutes, alternative technologies and release control technologies;
 - b) Provide training to workers who directly contact POPs with regard to safety in production, so as to reduce their exposure to POPs in production and use;
- (5) Special groups:
 - a) Launch educational and training activities for students, women and children through schools, communities, organizations for protecting women and children, organizations for protecting consumers' rights and interests and other institutions, and encourage these organizations and institutions to further carry out publicity activities for the public;
 - b) Pass on knowledge about POPs to special groups possibly affected by POPs in regions with relatively intensive releases of POPs, including the hazards of POPs and the primary symptoms of POPs-related acute and chronic diseases; provide them with training on practical daily prevention and self-help measures in case of emergency, etc.
- (6) The public:
 - a) Hold hearings to promote public participation in decision making and to encourage the public to take part in Convention implementation activities;
 - b) Give broad publicity to the necessity and importance of reducing and controlling POPs, and disseminate to the public POPs-related knowledge, particularly the knowledge of such aspects as POPs hazards, POPs sources, behavior of POPs in the environment, processes and technologies for controlling POPs, environmentally sound substitutes/alternative technologies, relevant policies and regulations, etc.;
 - c) Set up a special window on the website, *China's POPs Actions for Convention Implementation* (www.china-pops.org), to provide the public with information and advice pertaining to POPs;
 - d) Strengthen the design of activities for environmental protection in rural areas and carry out educational and publicity activities relating to the prevention of POPs hazards, taking into consideration the *Outline of the 11th Five-Year Plan for National Economy and Social Development*;
 - e) Encourage nongovernmental organizations to play a role in promotion and oversight relating to POPs hazards;

- (7) Set up incentives to encourage best practices that can significantly contribute to the reduction, elimination and prevention of POPs threats.

3.3.14 Actions for the effectiveness evaluation

Action objective: Evaluate regularly the effects of Convention implementation to provide a scientific basis for defining/adjusting mechanisms for implementation of the Convention and for the policies and actions of the parties to the Convention regarding its implementation.

Gaps in Convention implementation:

- China has not yet organized nationwide, long-term and systematic monitoring of the concentrations and the distribution of POPs in humans and environmental media;
- The capacity for Dioxin monitoring has yet to be strengthened; and
- No effectiveness evaluation system and mechanism has been established.

Specific actions:

- (1) Make an overall investigation of monitoring activities carried out with regard to POPs concentrations in breast milk, blood and air; assist the expert panel provisionally established under the Convention in conducting the complementary work of monitoring; and fulfill the first evaluation in 2009 pursuant to the resolution of the 2nd Conference of the Parties.
- (2) Make a request for financial and technical assistance to enhance China's capacity for the implementation of the Global Monitoring Plan (GMP); develop a monitoring plan for China's effectiveness evaluation of its implementation of the Convention; and regularly organize monitoring and evaluation pursuant to requirements of the Convention and to decisions by the Conference of the Parties;
- (3) Relying on the management information mechanism for Convention implementation, gradually establish a system for collecting and reporting the scientific, environmental, technical and economic information that reflects China's progress in the work of Convention implementation;
- (4) Regularly submit to the Secretariat of the Convention the POPs monitoring reports, national reports and information on noncompliance of the Convention.

3.3.15 Reporting

Action objective: Summarize and analyze the basic conditions of POPs in China, and complete on a periodic basis the relevant reports specified by the Convention.

Specific actions: Relying on the management information mechanism for Convention implementation, submit the first national report to the Secretariat of the Convention, specifying the measures taken for the implementation of the Convention and assessing the effectiveness of these measures; submit a report thereafter once every four years; and establish a reporting mechanism and strengthen the building of relevant capacity.

To meet the need for developing national reports, the following specific arrangements are made based on the current administrative system and on related laws and regulations:

- (1) The National Development and Reform Commission will be in charge of gathering data on the production of DDT, HCB, chlordane and mirex; the State Environmental Protection Administration, together with the Ministry of Agriculture, the Ministry of Health, the General Administration of Quality Supervision, Inspection and Quarantine and other related departments, will summarize data on the use and storage of DDT, HCB, chlordane and mirex, and report in writing prior to June 30 of each year to the NCG on their status in the previous year.
- (2) The General Administration of Customs will be in charge of gathering information on the import and export of DDT, HCB, chlordane and mirex, and report prior to June 30 of each year to the NCG on relevant data.
- (3) The State Electricity Regulatory Commission will be responsible for investigating PCBs-containing equipment currently in use, and will report in writing to the NCG on its investigation results.
- (4) Departments concerned under the State Council will conduct evaluation of their respective policies, laws, regulations and departmental rules pertaining to Convention implementation that they have formulated or have taken the lead to formulate as well as evaluation of the implementation of such policies, rules and regulations, and submit their evaluation reports to the NCG.
- (5) The State Environmental Protection Administration will be responsible for summarizing all materials and data, organizing the development of drafts of the national report, and submitting them to the NCG for review.

3.3.16 Monitoring, research and development

I. Monitoring

Objective: Monitor and get a grip on the production and release of POPs, and on their content, trends and extent of hazard in humans and the environment, so as to provide a basis for the supervision and management of POPs and support for effectiveness evaluation of Convention implementation.

Gaps in Convention implementation:

- Limited scope and objects being monitored, and lack of systematic monitoring of media;
- Inadequate understanding of the release sources, forms and amounts of POPs; and
- Incomplete monitoring technologies and methods and poor comparability of data, making it difficult to indicate pollution conditions and trends.

Co-benefits: Promote the improvement in environmental monitoring technologies and methods; give an impetus to the development and improvement of environmental monitoring standards; and strengthen the government's environmental monitoring capacity.

Action 1: Establish and improve a POPs monitoring system

Action objective:

- (1) Establish and improve regulations on the standard methods and data management for POPs monitoring, and improve management rules and

- regulations;
- (2) Establish a complete POPs monitoring network;
 - (3) Enhance capacity for POPs monitoring;
 - (4) Pursuant to requirements of Convention implementation, organize the development of POPs monitoring plans.

Specific actions:

- (1) The State Environmental Protection Administration will, together with the Ministry of Health: gradually include the monitoring of pesticide-like POPs and PCBs into the routine monitoring of environmental monitoring stations and disease control stations at the national, provincial and municipal (regional) levels; organize to establish and improve environmental and health standard monitoring methods on POPs; establish a certification system for laboratories to make their management level and quality control/assurance systems consistent with relevant international standards; and develop regulations on the exchange and summarization of POPs monitoring data and improve the reporting system of POPs monitoring data.
- (2) On the basis of China's environmental monitoring network and food pollution monitoring network, and taking into account the existing related laboratories of agriculture departments and other departments concerned, improve the POPs monitoring network, and begin to establish a national Dioxin monitoring system.
- (3) Carry out monitoring demonstration activities, replenish monitoring stations included in the monitoring network with instruments and equipment, and conduct training for their personnel.
- (4) Develop annual plans and long-term plans for POPs monitoring, and put into effect monitoring tasks and implementation budget.

Action 2: Monitor release sources of POPs

Action objective:

- (1) Through monitoring of the intensities and changes of all sorts of POPs release sources, provide basic data for the evaluation of POPs release reduction effects and environmental impacts.
- (2) Through monitoring of key industries and sources of Dioxin, provide data support for the evaluation of implementation effectiveness of BAT/BEP.

Specific actions: The State Environmental Protection Administration will:

- (1) Organize to place emphasis on the monitoring of releases from pesticide-like POPs production enterprises;
- (2) Together with departments concerned, stress the monitoring of burying sites and areas around out of service PCBs-containing equipment, and conduct the total process of supervision and management of PCBs-containing substances in their collection, clean-up, destruction, etc.; and
- (3) Based on the technical level, equipment and operating conditions of relevant industries in China, conduct actual monitoring of release sources in selected key industries and enterprises with Dioxin releases, so as to gain data on releases, and conduct monitoring of the ambient environment of key enterprises with Dioxin releases.

Action 3: Monitor the presence and levels of POPs in environmental media and organisms

Action objective:

- (1) Monitor the concentrations of POPs in air and trends in their changes to provide basic data for the effectiveness evaluation of phase-out activities.
- (2) Monitor the concentrations of POPs in soils and trends in their changes to provide clues for making a thorough investigation of burying sites of off-line PCBs-containing electrical equipment, and to provide a basis for evaluating impacts of POPs on the safety of farm crops.
- (3) Monitor concentrations of POPs in water bodies and trends in their changes, and then proceed to evaluate their impacts on safety of aquatic animals and plants.
- (4) Monitor concentrations of POPs in animals and plants and trends in their changes to provide a basis for wildlife protection and food safety.

Specific actions: The State Environmental Protection Administration will, together with departments concerned, carry out the following activities:

- (1) Monitor trends in concentration changes of POPs in air, carry out monitoring activities by stages and by regions, and shift gradually to nationwide periodic monitoring;
- (2) Monitor concentration changes of POPs in soils, giving preference to regions where POPs were substantially used historically; carry out monitoring activities aimed mainly at POPs substances used at the initial stage, and expand gradually into carrying out nationwide periodic monitoring activities;
- (3) Organize to monitor concentration changes of POPs in water bodies; water areas to be monitored shall cover main rivers, lakes, coastal water bodies, drinking water sources and water areas near main pollution sources in the country; objects to be monitored shall, besides water bodies, include surface sediments and aquatic organisms.
- (4) Organize to monitor concentration of POPs in organisms; choose representative wild animals and domestic animals for monitoring, giving preference to regions with relatively severe pollution for monitoring activities.

Acton 4: Monitor POPs contaminated sites

Action objective: Monitor sites with accumulated POPs wastes and POPs contaminated sites, so as to:

- (1) provide a basis for the disposal and remediation of the sites;
- (2) provide a basis for the evaluation of impacts of the contaminated sites on the ambient environment; and
- (3) put forward reports on the inventory of POPs contaminated sites on a timely basis.

Specific actions: The State Environmental Protection Administration will organize activities for the monitoring and investigation of POPs contaminated sites. Monitor of POPs content of contaminated sites as well as of soil, surface water, leachate and ground water from their areas ambient will be organized; establish an inventory of key contaminated sites, which will be summarized and submitted by provincial environmental monitoring stations to the State Environmental Protection

Administration.

Action 5: Monitor POPs content in agricultural products, food and drinking water

Action objective: Conduct routine monitoring of POPs content in agricultural products, food and drinking water, so as to:

- (1) provide a basis for establishing China's standards for the limits of POPs residues in **agricultural products** and food;
- (2) provide a basis for the research and evaluation of risks from physical exposure to POPs; and
- (3) provide basic data for the evaluation of the effectiveness of phase-out activities.

Specific actions: The Ministry of Agriculture, the Ministry of Health and the Ministry of Construction will: give priority to carrying out monitoring activities in regions severely polluted by POPs; according to the dietary structure of Chinese residents, choose representative **agricultural products** and foods to measure their POPs content; conduct monitoring of POPs content in drinking water; and prepare monitoring reports on POPs content in **agricultural products**, food and drinking water. Monitoring objects and media mainly include:

Monitoring Object	Monitoring Item
Pesticide-like POPs	Food, vegetable, fruit, meal, eggs, dairy products, tea, drinking water, animal feed, etc.
PCBs	Fish, shellfish, dairy products, meal, eggs, edible oil, drinking water, poultry, animal feed, etc.
Dioxin	Fish, shellfish, dairy products, meal, eggs, edible oil, animal feed, drinking water, etc.

Action 6: Monitor residual body concentrations of POPs in key groups exposed to POPs and in ordinarily residents

Action objective: Monitor the residual body concentration of POPs in Chinese residents, so as to:

- (1) provide a basis for the evaluation of hazards arising from different routes of exposure and of the impacts of POPs on physical health; and
- (2) provide basic data for the evaluation of effectiveness of phase-out activities.

Specific actions: The Ministry of Health will, together with the State Environmental Protection Administration and other departments concerned: spot-check key groups exposed to POPs; conduct follow-up monitoring of a portion of monitored objects for a period of at least 5 years; spot-check residents engaged in ordinary professions in general regions; and by 2020, organize and compile analysis reports on the concentration monitoring of physical exposure to POPs.

II. Research and development

Objective: Conduct research on the transport and transformation patterns for POPs in the environment, and on impacts of POPs on human health, environment, society,

economy and culture; develop products/technologies to substitute for, reduce and/or eliminate POPs releases as well as measurement and analysis technologies; study accumulation and magnification of POPs in humans, as well as their exposure to organisms and humans; and strengthen the research on mechanisms for degradation and removal of POPs.

Gaps in Convention implementation:

- Of the research on POPs carried out in recent years in China, little focus was put on PCBs and Dioxin;
- In research on impacts of POPs on the ecological environment, very little research was conducted on fundamental sciences, such as POPs transport and transformation mechanisms and their toxicology;
- In research on degradation technologies for POPs, more emphasis is placed on degradation conditions and efficiency of degradation, and less on their course of degradation and end products;
- Production of POPs alternatives relies mainly on introduction from other countries; and
- Lack of independent development capacity and urgent needs to develop Dioxin release reduction technologies, technologies for disposal of POPs pollutants, and economically applicable and environmentally sound alternatives and alternative technologies.

Co-benefits: Promote improvement in scientific research and development capabilities of China; facilitate improvement in development and innovation capacities for new products and technologies; and promote development of the environmental protection industry.

Action 7: Carry out studies of POPs transport and transformation behavior

Action objective: Study the behavior of POPs in the multi-medium environment, including the process of transport in the atmosphere, the process of soil-air exchange, the process of transmission in water bodies, etc., as well as the biodegradation rate of POPs in the environment, so as to provide support for the control of pollution caused by POPs.

Specific actions: The Ministry of Science and Technology will, together with departments concerned, organize studies of: the characteristics, historical evolution and trends in POPs pollution in typical regions of China; typical release modes for POPs; routes of transport and transport models for POPs; presence, state and environmental fate of POPs in highly contaminated sediments; and the transport and enrichment mechanism of POPs through food chains as well as their biological effects.

Action 8: Carry out studies of physical exposure to POPs and risk evaluation of POPs impacts on the ecological environment and human health

Action objective:

- (1) Conduct research on the risk evaluation of impacts of POPs exposure on the ecological environment and human health.
- (2) Study the dose-effect relationships on the ecological environment and health

impacts.

(3) Study impacts of POPs on the entire ecological system.

Specific actions: The Ministry of Science and Technology, the Ministry of Health and the State Environmental Protection Administration will, together with departments concerned: organize the study of biological indicators that reflect environmental exposure to POPs; conduct research on the dose-effect relationships with regard to impacts of POPs exposure on the biological environment and human health; establish a standard system for the safety assessment of POPs impacts on human health; establish exposure models and conduct model studies, which mainly include the impacts of the long-range transport of POPs pollutants in the atmosphere on the ecological system; study ecological risks of POPs in soils; study the formation, impacts, etc. of zones severely contaminated by POPs in water bodies; and study environmental benefit and cost analysis.

Action 9: Carry out development of POPs monitoring methods

Action objective: Organize to develop new, fast, simple and economically feasible chemical and biological determination methods, and develop standard samples so as to provide support for monitoring of POPs.

Specific actions: The Ministry of Science and Technology and the State Environmental Protection Administration, together with departments concerned, will organize the development of various methods for monitoring POPs, for instance, quick and ultra-trace monitoring methods, and standard samples research as well.

Action 10: Conduct technical and economic analysis and studies for BAT/BEP activities

Action objective: To carry out activities for reducing releases of unintentionally produced POPs, great efforts should be made to promote BAT/BEP activities. The purpose of this study is to evaluate costs required for such activities, so as to provide support for decision making.

Specific actions: The National Development and Reform Commission and the State Environmental Protection Administration will organize the research on the technical and economic assessment for BAT/BEP application, and evaluate social benefits from BAT/BEP.

Action 11: Carry out development of POPs alternatives/alternative technologies

Action objective: Develop practicable POPs alternatives or alternative technologies.

Specific actions: The Ministry of Science and Technology will, together with the State Environmental Protection Administration and related departments and industrial organizations: study and establish evaluation methods for alternatives to POPs and encourage the development of economically practicable alternatives; and organize the development of alternatives/alternative technologies to pesticide POPs.

Action 12: Carry out development of waste disposal technologies and emission

control technologies

Action objective: Provide technical support for the safe disposal of POPs wastes and for reduction of Dioxin releases.

Specific actions: The Ministry of Science and Technology will, together with the State Environmental Protection Administration and related departments: organize the conduct of research on new technologies for the disposal of pesticide-like POPs, PCBs and Dioxin wastes, including incineration technologies, photocatalytic degradation technologies, biodegradation technologies, non-incineration technologies, etc.; develop technologies for the reduction and control of POPs releases from sources of unintentionally produced POPs; develop technologies for the prevention of pollution caused by unintentionally produced POPs; and actively carry out activities on BAT/BEP research and on development of BAT/BEP facilities.

3.3.17 Technical and financial assistance

Objective: Strengthen the building of institutional capacity relating to technical and financial assistance, establish relevant operating mechanisms and mobilize related technical and financial resources in China, and the world as well, to support the reduction and control of POPs.

I. Technical assistance and technology transfer

Action objective: Establish and improve technical assistance and technology transfer mechanisms so as to promote technical assistance and technology transfer at home and abroad, for the implementation of Convention.

Specific actions: To fulfill the requirements of Article 12 under the Convention, the Convention Implementation Office will organize the work of promoting and implementing technical assistance and technology transfer, and undertake the work of promoting technical assistance and technology transfer between China and developed and other developing countries, including:

- (1) organization of the research and determination of priority areas of China that need technical assistance and technology transfer in the near future and in the following mid and long terms;
- (2) proposing to the relevant conferences and agencies of the Convention the requests for technical assistance and technology transfer;
- (3) searching for and the promotion of bilateral and multilateral technical assistance and technology transfer through South-South Cooperation and South-North Cooperation;
- (4) organization and promotion of domestic activities pertaining to technology transfer; and
- (5) timely updating of priority areas of China that need technical assistance and technology transfer.

Pursuant to selected strategies and activities, the priority areas of China that need technical assistance and technology transfer have basically been identified, including:

- (1) Identification and evaluation of the needs for technical assistance and technology transfer. Through training of management personnel in charge of

- issues relating to the Convention, identify the needs for technical assistance, and evaluate obstacles and barriers to technology transfer as well as ways of overcoming such obstacles and barriers.
- (2) Improvement of the ongoing inventory of POPs. By improving POPs monitoring capacity and carrying out systematic investigation and monitoring activities, complete the ongoing inventories of POPs release and pollution status.
 - (3) Environmental impact assessment and risk evaluation. Based on the inventories of POPs releases and pollution status, conduct POPs environmental impact assessments and risk evaluations.
 - (4) Evaluation of socio-economic impacts of Convention implementation. Through evaluation of the financial needs for Convention implementation and of the availability of funds, and based on China's overall development strategies and plans, conduct the evaluation of socio-economic impacts of Convention implementation.
 - (5) Strengthening the environmentally sound management of POPs.
 - a) On the basis of environmental risk assessment and socio-economic impact evaluation of Convention implementation, formulate and implement management methods for POPs and effective measures to reduce or eliminate POPs.
 - b) Improve the infrastructure of relevant management institutions at national and local levels, so as to enhance their capabilities for environmentally sound management.
 - (6) Research, development and promotion of the following technologies relating to POPs alternatives/release reduction:
 - a) POPs alternatives/alternative technologies;
 - b) BAT/BEP appropriate for different industries;
 - c) Treatment and disposal technologies for POPs-containing wastes; and
 - d) Remediation technologies for POPs contaminated sites.

II. Financial assistance

Action objective: Gradually improve the financial assistance mechanisms to meet financial requirements for reducing, eliminating and preventing releases of POPs.

Specific actions: Gradually define and update priorities and financial requirements for reducing, eliminating and preventing releases of POPs; gradually establish and improve financial mechanisms for Convention implementation through developing related laws, regulations, technical specifications and guidance to ensure financial sources, determining burden sharing principles for funds used to reduce and control POPs pollution, and formulating guidance on fund use and management; and include the financial mechanisms into the long-term, effective mechanism for reducing and controlling POPs.

Funds for China to implement the Stockholm Convention come mainly from central and local finances, corporate and private finances, and multilateral and bilateral funds. Financial assistance mainly includes multilateral funds and bilateral funds. Priorities requiring financial assistance include:

- (1) Establishment and improvement of relevant policies, laws, regulations, standards, guidance and technical specifications, and strengthening of

- institutional capacity;
- (2) Promotion of the production, use and industrialization of alternatives, and elimination of the production and use of chlordane, mirex and DDT;
 - (3) Improvement of the capacity for monitoring POPs in humans and the environment;
 - (4) Investigation and update of the inventory of Dioxin releases and inventories of PCBs-containing electrical equipment in use and of POPs wastes;
 - (5) Implementation of BAT/BEP demonstrations on reducing Dioxin releases in key industries;
 - (6) Implementation of demonstrations on the environmentally sound management and disposal of POPs wastes;
 - (7) Capacity building in publicity, education, technical training, etc.; and
 - (8) Establishment of sound economic policies and long-term effective financial mechanisms regarding the environmentally sound management and disposal of POPs.

3.4 Proposals on and priorities for long-term capacity building for Convention implementation

Capacity building is the foundation for the implementation of the Convention and an important part of China's Convention implementation actions. It is inseparable from other activities of the Convention implementation and is an important guarantee for fulfilling the objectives of Convention implementation and ensuring successful implementation of the National Implementation Plan.

Objectives of long-term capacity building are:

- (1) Through the improvement of policy and regulatory frameworks, to establish financial mechanisms for the implementation of the Convention and build knowledge systems for environmental monitoring, research and development, technology transfer, etc., thus creating a favorable enabling environment for Convention implementation as well as support conditions;
- (2) By improving decision-making and control systems and strengthening the building of enforcement capacity and enforcement forces, to establish platforms and systems for data collection, processing and reporting, thus forming the management capacity of management institutions and their human resources; and
- (3) Through activities such as publicity and education, to improve public awareness of Convention implementation, create a sound social environment for Convention implementation actions, and ensure the effective implementation of the National Implementation Plan at the central and local levels.

Capacity building is a long-term process. Limited by such conditions as time and funds, priority can only be given to the most urgent aspects of activities to be carried out in the near future, according to existing conditions and Convention implementation requirements. Principles for selecting priorities are:

- capabilities relating to carrying out holistic activities for Convention implementation;
- relevant capabilities for which the Convention requires that priority be given for taking actions; and
- capabilities closely linked to fulfillment of immediate objectives of

Convention implementation.

Based on the aforesaid principles, capacity building priorities of China in the near future (2007-2010) can be identified, which at the least include:

- (1) Strengthening the capabilities of Convention implementation institutions.
 - a) Strengthen the decision making and coordination capabilities of the NCG, so as to promote scientific decision making on Convention implementation from such aspects as policies, technology and fundamental research;
 - b) Strengthen capabilities of the member units of the NCG regarding policy making, basic investigation and research, data collection, information exchange and communication, and supervision and management;
 - c) Improve the implementation capabilities of the Convention Implementation Office;
 - d) Improve Convention implementation awareness at the local level, strengthen capabilities for developing relevant local policies, regulations and plans, and enhance capabilities for implementation of activities for Convention implementation, fund procurement, basic investigation and research, and information collection and reporting; and
 - e) Strengthen the capabilities of industrial associations regarding organization, coordination and publicity relating to Convention implementation in relevant fields.
- (2) Improvement of the regulatory framework. Pursuant to requirements of Convention implementation, draft plans for the development or revision of relevant laws, rules and regulations, and incorporate them in the relevant legislative calendars of the state to make regulations on such aspects of POPs as production, use, import and export, waste and release; and develop/revise standards and technical specifications pertaining to POPs.
- (3) Establishment of economic policies and financial mechanisms on Convention implementation. Establish and improve economic policies that help to prevent, reduce and eliminate POPs hazards, as well as environment protection input and operational mechanisms, aiming at ensuring the implementation of action plans for Convention implementation.
- (4) Improvement of POPs monitoring capacity. Improve the existing system of monitoring networks, include POPs in monitoring targets, establish standard analysis methods for POPs, and build quality control and management systems for POPs laboratories, thus forming the capacity for conducting nationwide monitoring of POPs and for getting a grip on the status of POPs release and pollution, so as to provide a scientific basis for the management and control of POPs and to evaluate objectively the effectiveness of Convention implementation.
- (5) Acceleration of technological development and promotion.
 - a) Evaluate the technological requirements for Convention implementation, identify economically and technically feasible technologies, and establish a technology assessment system and a technology transfer center;
 - b) Develop systems on technological registration, certification and incentives, thus promoting the independent development and broad application of alternatives/alternative technologies for POPs which urgently need to be phased out, waste treatment and disposal technologies, and BAT/BEP for the control of Dioxin releases.
- (6) Conducting publicity and education on Convention implementation. Carry out

publicity and educational activities relating to the hazards of POPs and to national Convention implementation actions, aiming at decision-making levels (government departments at all levels and concerned ministries and commissions), technology levels (industries and associations involved in projects), groups directly involved in the production, distribution and use of POPs, and the public in regions with relatively intensive releases of POPs, so as to begin to create a social atmosphere that all people have a deepening understanding of POPs, from attention to concern and from understanding to cognition, and to create conditions for winning wide-ranging support for China's Convention implementation actions from all ranks at home and abroad.

Capacity building priorities for the period from 2010 to 2015 will be subject to the implementation of the National Implementation Plan.

3.5 Timetable for the implementation of action plans

See Table 3-8 for the timetable pursuant to action plans in 3.3.

Table 3-8 Summary of Actions for the National Implementation Plan

Type of activity	Activities								
Building of institutions, policies and regulations, and other infrastructure	Institutions and capacity building	Develop and improve laws and regulations on POPs management	Build a standard system on POPs management	Revise and improve the existing lists relating to POPs management	Strengthen enforcement and encourage public participation	Promote information exchange for concerned parties	Public information, awareness and education	Capacity and system building for effectiveness evaluation and reporting	Capacity and system building for technical assistance and technology transfer
Investigation and establishment of release inventories	Reporting of inventories of pesticide POPs listed in Annex A	Identify and label equipment containing PCBs in use, and gradually improve their inventories	Reporting of inventories of DDT listed in Annex B	Establish a reporting mechanism for dioxin release sources	Establish ongoing inventories of dioxin releases in key industries	Improve the ongoing database system for POPs stockpiles and wastes	Identify POPs stockpiles, articles in use and wastes		
Promotion and application of various control technologies and alternative technologies	Demonstrate and promote alternatives and alternative technologies	Development of technologies for disposal and reduction of POPs wastes	Capacity building for disposal of wastes	Demonstration and promotion of release reduction technologies					
Implementation of release control	Restrict and gradually eliminate the production and use of chlordane and mirex	Prohibit the production and use of HCB	Environmentally sound management of in use electrical equipment containing PCBs	Restrict and phase out production, use and export	Control pollution in production and use with exemptions and for acceptable purposes	Measures and actions to control new release sources of unintentionally produced POPs	Actions to reduce and control existing release sources	Implement plans for the environmentally sound disposal of POPs wastes	Environmentally sound management of contaminated sites
Monitoring, research, evaluation and reporting	Evaluation of and research on the Convention implementation mechanisms and policies	Evaluate effectiveness of release reduction	Carry out relevant scientific research	Carry out relevant technological development	Evaluate effectiveness of Convention implementation and relevant policies	Report relevant information on and effectiveness of Convention implementation			

Table 3-9 Action plan for the building of institutional capacity and of policies and regulations

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	A. Institutions and capacity building	State Environmental Protection Administration and related departments									
2	Action 1 Capacity building for the NCG		✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Action 2 Capacity building for departments involved in Convention implementation		✓	✓	✓	✓	✓	✓	✓	✓	✓
4	Action 3 Capacity building for the Office of the NCG		✓	✓	✓	✓	✓	✓	✓	✓	✓
5	Action 4 Capacity building for local departments involved in Convention implementation		✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Action 5 Capacity building for sectors related to Convention implementation		✓	✓	✓	✓	✓	✓	✓	✓	✓
7	B. Develop and improve laws and regulations on POPs management										
8	Action 1 Develop a plan for the development/revision of relevant laws and regulations	State Environmental Protection Administration, and related departments	✓	✓	✓	✓	✓	✓	✓	✓	✓
9	Action 2 Develop <i>Regulatory Measures or Guiding Policy on the Reduction and Control of Persistent Organic Pollutants (POPs)</i>	State Environmental Protection Administration	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	C. Build the standards' system for POPs management	State Environmental Protection Administration and related departments									
11	Action 1 Revise related environmental quality standards		✓	✓	✓	✓	✓	✓	✓	✓	✓
12	Action 2 Revise or develop related product quality standards, health standards and other standards		✓	✓	✓	✓	✓	✓	✓	✓	✓
13	Action 3 Revise or develop emission standards for pollutants in key industries		✓	✓	✓	✓	✓	✓	✓	✓	✓
14	Action 4 Develop cleaner production standards, technology policies or technical specifications for relevant industries		✓	✓	✓	✓	✓	✓	✓	✓	✓

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
15	D. Revise and improve the existing lists relating to POPs management	State Environmental Protection Administration and related departments									
16	Action 1 Revise the <i>List of Hazardous Chemicals</i> and the <i>List of Dangerous Goods</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓
17	Action 2 Revise the <i>Guiding Catalog of Industrial Structure Regulation</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓
18	E. Strengthen enforcement and encourage public participation	State Environmental Protection Administration and related departments									
19	Action 1 Strengthen enforcement		✓	✓	✓	✓	✓	✓	✓	✓	✓
20	Action 2 Promote public participation		✓	✓	✓	✓	✓	✓	✓	✓	✓
21	F. Carry out evaluation and research of the Convention implementation mechanisms and policies	State Environmental Protection Administration and related departments									
22	Action 1 Carry out the study of POPs impacts and the evaluation and study of candidate and newly listed POPs		✓	✓	✓	✓	✓	✓	✓	✓	✓
23	Action 2 Promote the study of policies pertaining to alternatives, alternative technologies and pollution control technologies		✓	✓	✓	✓	✓	✓	✓	✓	✓
24	Action 3 Carry out the study of financial mechanisms and economic policies		✓	✓	✓	✓	✓	✓	✓	✓	✓
25	Action 4 Regional demonstration		✓	✓	✓	✓	✓	✓	✓	✓	✓
26	Action 5 Carry out the evaluation of NIP implementation effectiveness and the study of measures to mitigate POPs impacts		✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 3-10 **Actions for the reduction or elimination of the intentionally produced and used pesticide POPs**
chemicals listed in Part I of Annex A under the Convention

	Specific actions	Implementation Body	2007	2008	2009	2010
1	Action 1 Rigidly restrict and gradually eliminate the production and use of chlordane and mirex					
2	Formulate technical policies and criteria to stop the use of POPs and encourage IPM for preventing and control of termites	Ministry of Construction	✓	✓		
3	Promote the research, development and public awareness of environmentally sound alternatives or IPM in termite prevention and control	Ministry of Science and Technology, together with Ministry of Construction, State Environmental Protection Administration and Ministry of Agriculture	✓	✓	✓	✓
4	Demonstrate and gradually promote the elimination of chlordane and mirex in the prevention and control of termites	State Environmental Protection Administration, together with Ministry of Construction and Ministry of Agriculture	✓	✓	✓	✓
5	Carry out training and publicity activities on alternatives to chlordane and mirex in the prevention and control of termites	State Environmental Protection Administration, together with related departments in charge	✓	✓	✓	✓
6	Action 2 Prohibit the production and use of HCB					
7	Prohibit the production and use of HCB by means of updating related catalogs and regulations	National Development and Reform Commission, together with and Ministry of Agriculture and State Environmental Protection Administration	✓	✓		
8	Examine enterprises which ever produced HCB or use HCB as an intermediate to produce PCP and sodium pentachlorophenol	National Development and Reform Commission, together with State Environmental Protection Administration and Ministry of Agriculture	✓			
9	Action 3 Strictly implement laws and regulations pertaining to prohibiting the import and export of the chemicals listed in Part I of Annex A under the Convention					
10	Strictly enforce laws and regulations so as to prevent the import and export of intentionally produced pesticide POPs listed in Part I of Annex A under the Convention.	State Environmental Protection Administration, General Administration of Customs and Ministry of Commerce	✓	✓	✓	✓

	Specific actions	Implementation Body	2007	2008	2009	2010
11	Action 4: Control pollution caused by chlordane and mirex in their production, distribution and use for specific exemptions					
12	Implement compulsory cleaner production auditing so as to minimize pollution caused by pesticide POPs in production and processing	State Environmental Protection Administration	✓	✓	✓	
13	Carry out training for existing enterprises and stations with exempted production and use of chlordane and mirex, aiming at effectively controlling POPs releases and their exposure to humans	State Environmental Protection Administration, together with related departments	✓	✓	✓	
14	Strictly supervise and manage stockpiles of chlordane and mirex	State Administration of Work Safety, State Environmental Protection Administration, National Development and Reform Commission, Ministry of Agriculture, Ministry of Construction and other related departments	✓	✓	✓	

Table 3-11 Actions for the identification, elimination and environmentally sound management of electrical equipment containing PCBs in use

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Action 1 Improve the system for environmentally sound management of PCB-containing equipment currently in use	State Environmental Protection Administration, together with State Electricity Regulatory Commission and other departments concerned									
2	Legal system building for environmental management of PCB-containing equipment in use		✓	✓	✓	✓					
3	The building of technical standards and specifications for the environmentally sound management of PCB-containing equipment in use		✓	✓	✓	✓					
4	Action 2 Strengthen the capacity of related management institutes in charge of currently used equipment containing PCBs	State Environmental Protection Administration together with State Electricity Regulatory Commission									
5	Evaluate and improve environmental management functions for PCB-containing equipment in use		✓	✓	✓	✓					
6	Carry out training on the environmentally sound management of PCB-containing equipment in use		✓	✓	✓	✓					
7	Action 3 Identify and label equipment containing PCBs in use, and gradually improve their inventories	State Environmental Protection Administration together with State Electricity Regulatory Commission and other departments concerned									
8	Identify and label PCB-containing equipment in use in the demonstration provinces		✓	✓	✓	✓					
9	Identify and label high-risk PCB-containing equipment in use nationwide		✓	✓	✓	✓	✓	✓	✓	✓	✓
10	Identify and label nationwide equipment in use with PCBs content over 50ppm		✓	✓	✓	✓	✓	✓	✓	✓	✓

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
11	Action 4: Conduct the removal of PCBs in PCB-containing electrical equipment currently in use or the environmentally sound management of the equipment	State Environmental Protection Administration, together with State Electricity Regulatory Commission and related industrial associations									
12	Evaluate the operating conditions and environmental risk of PCB-containing equipment currently in use		✓	✓	✓	✓					
13	Implement, by stages, environmentally sound management of or the removal of PCBs in PCBs-containing equipment in demonstration provinces and of those with high risk nationwide		✓	✓	✓	✓	✓	✓	✓	✓	✓
14	Achieve the elimination of PCBs contained in equipment in use nationwide, or the environmentally sound disposal of the equipment		✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Achieve gradually the elimination of PCBs contained in equipment in use nationwide with PCBs content over 50 ppm, or the environmentally sound disposal of the equipment		✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 3-12 **Actions to eliminate and restrict the production, use, import and export of DDT**

	Specific actions	Implementation Body	2007	2008	2009	2010
1	Action 1 Strictly restrict and phase out the production and use of DDT					
2	Set forth regulations strictly limiting the production and use of DDT	National Development and Reform Commission, together with Ministry of Health, Ministry of Agriculture and State Environmental Protection Administration	✓			
3	Carry out DDT elimination in the marine antifouling paint industry	State Environmental Protection Administration, together with related departments, industrial associations and enterprises	✓	✓	✓	
4	Evaluate and timely terminate the production and use of DDT to produce dicofol in non-closed systems	National Development and Reform Commission, together with Ministry of Agriculture and State Environmental Protection Administration	✓	✓		
5	Temporarily reserve DDT production capacity for disease vector control	National Development and Reform Commission, together with Ministry of Health, Ministry of Agriculture and State Environmental Protection Administration	✓	✓	✓	✓
6	Evaluate the necessity of reserving the use of DDT for disease vector control and promote alternatives/alternative technologies	Ministry of Health, together with State Environmental Protection Administration	✓	✓	✓	
7	Develop plans for elimination of DDT production	National Development and Reform Commission, together with State Environmental Protection Administration and Ministry of Agriculture	✓	✓		
8	Supervise the production, use, distribution and storage of DDT	National Development and Reform Commission, together with Ministry of Agriculture, State Administration of Work Safety, Ministry of Health and State Environmental Protection Administration	✓	✓	✓	
9	Action 2 Impose strict control on import and export of DDT	State Environmental Protection Administration, together with General Administration of Customs and Ministry of Commerce				
10	Strictly implement the existing systems to restrict the import and export of DDT		✓	✓	✓	✓
11	Prohibit the import and export of DDT		✓	✓	✓	

	Specific actions	Implementation Body	2007	2008	2009	2010
12	Action 3 Control pollution from the production, distribution and use of DDT for exemptions and for acceptable purposes					
13	Implement mandatory audit of cleaner production to minimize releases of DDT	State Environmental Protection Administration	✓	✓	✓	
14	Strictly supervise and implement standards on residues of DDT as intermediate in dicofol products and minimize DDT releases in its uses	Ministry of Agriculture, State Environmental Protection Administration, General Administration of Quality Supervision, Inspection and Quarantine, and other related departments.	✓	✓	✓	
15	Carry out training aiming at effectively controlling DDT releases and exposure to humans during production and use	State Environmental Protection Administration together with related associations	✓	✓	✓	
16	Strictly supervise and manage the safety, environmental protection, distribution and use of DDT stockpiles	State Administration of Work Safety, State Environmental Protection Administration, National Development and Reform Commission, Ministry of Agriculture and other related departments.	✓	✓	✓	✓

Table 3-13a Actions to reduce and eliminate releases of unintentionally produced POPs

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	A. Measures and actions to control new release sources of unintentionally produced POPs										
2	Action 1 Evaluate the technical feasibility of applying BAT to new sources in key industries	National Development and Reform Commission and State Environmental Protection Administration, together with related departments and industries	✓	✓							
3	Action 2 Improve the environmental impact assessment system for new sources in key industries	State Environmental Protection Administration, together with related departments and industries	✓	✓							
4	Action 3 Revise the <i>Guiding Catalogue of Industrial Structure Regulation</i>	National Development and Reform Commission, together with State Environmental Protection Administration and related departments and industries	✓	✓							
5	Action 4 Establish and improve release standards for new sources in key industries	State Environmental Protection Administration, together with related departments and industries	✓	✓	✓						
6	B. Establish ongoing inventories of dioxin releases in key industries										
7	Action 1 Establish and strengthen the national capacity for dioxin monitoring	State Environmental Protection Administration and Ministry of Health, together with Ministry of Science and Technology	✓	✓	✓	✓					
8	Action 2 Establish inventories of dioxin release sources nationwide	State Environmental Protection Administration,	✓	✓	✓	✓					

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
		together with related departments and industries									
9	Action 3 Accomplish the systematic monitoring of dioxin releases in key industries	State Environmental Protection Administration	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	Action 4 Establish a mechanism for ongoing monitoring and data reporting of dioxin releases in key industries by 2015	State Environmental Protection Administration	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	C. Actions to reduce and control existing release sources										
12	Action 1 Give priority to carrying out BAT/BEP application demonstration activities at the enterprise level in present key industries	State Environmental Protection Administration, together with National Development and Reform Commission, Ministry of Construction, and related departments	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	Action 2 Improve the cleaner production standards or cleaner production audit guidelines for key industries, and promulgate BAT/BEP guidance for key industries	State Environmental Protection Administration, together with related departments	✓	✓	✓	✓					
14	Action 3 Begin to establish and improve standards for dioxin releases from existing sources in key industries	State Environmental Protection Administration, together with related departments	✓	✓	✓	✓					
15	Action 4 Accomplish the first stage of work in promoting BAT/BEP in existing key industries	State Environmental Protection Administration, together with National Development and Reform Commission and related departments and industries				✓	✓	✓	✓	✓	✓
16	Action 5 Further revise the cleaner production standards and cleaner production audit guidelines on existing sources in key industries, as well as BAT/BEP guidance for the key industries of China	State Environmental Protection Administration, together with related departments and industries				✓	✓	✓	✓	✓	✓

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
17	Action 6 Further revise the previously established release standards for existing sources in key industries	State Environmental Protection Administration, together with related departments and industries				✓	✓	✓	✓	✓	✓
18	Action 7 Accomplish the second stage of BAT/BEP promotion for the existing sources in the key industries by 2025	State Environmental Protection Administration, together with related departments and industries									

Table 3-13b Actions to reduce and eliminate releases of unintentionally produced POPs

	Specific actions	Implementation Body	2016	2017	2018	2019	2020
1	D. Continued release reduction and control of unintentionally produced POPs	State Environmental Protection Administration, together with related departments and industries					
2	Action 1 Establish a mechanism for the periodic evaluation and updating of unintentionally produced POPs release reduction and control strategies and of implementation effectiveness		✓	✓	✓	✓	✓
3	Action 2 Gradually establish and improve a policy guiding mechanism for the release reduction and control of unintentionally produced POPs		✓	✓	✓	✓	✓

Table 3-14 Acton plan for the identification and disposal of POPs stockpiles, wastes and contaminated sites

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	A. Actions and measures to reduce releases from POPs stockpiles and wastes										
2	Action 1 Improve the system for the environmentally sound management of POPs wastes	State Environmental Protection Administration, together with related departments									
3	Develop identification criteria for POPs wastes		✓	✓							
4	Revise the <i>National Catalogue of Hazardous Wastes</i> and include sources of POPs wastes containing dioxin		✓	✓							
5	Improve the information management system for POPs stockpiles and wastes		✓	✓	✓	✓					
6	Develop and improve management methods with regard to the import and export of POPs wastes		✓	✓	✓	✓					
7	Establish a specification system for the environmentally sound management and disposal of POPs wastes		✓	✓	✓	✓					
8	Action 2: Strengthen the capacity of relevant institutes for the environmentally sound management of POPs stockpiles and wastes	State Environmental Protection Administration, together with related departments									
9	Establish a management coordination mechanism and strengthen law enforcement		✓	✓	✓	✓					
10	Strengthen the capacity of the solid waste management centers at the national and provincial levels		✓	✓	✓	✓					
11	Strengthen the capacity for the enforcement and supervision of the environmentally sound management and disposal of POPs wastes		✓	✓	✓	✓					
12	Action 3 Improve capacity for the environmentally sound disposal of POPs	State Environmental Protection Administration, together with related departments									

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
13	Introduce and develop technologies for the environmentally sound disposal of POPs		✓	✓	✓	✓	✓	✓	✓	✓	✓
14	Build disposal facilities and carry out demonstration activities with regard to the environmentally sound disposal of POPs wastes		✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Action 4 Implement, and adjust on a timely basis, the plans for the environmentally sound disposal of POPs wastes	State Environmental Protection Administration, together with related departments									
16	Gradually manage and dispose of identified pesticide POPs wastes in an environmentally sound manner		✓	✓	✓	✓	✓	✓	✓	✓	✓
17	Gradually manage and dispose of identified PCB-containing wastes in an environmentally sound manner		✓	✓	✓	✓	✓	✓	✓	✓	✓
18	Gradually manage and dispose of identified dioxin wastes in key industries in an environmentally sound manner		✓	✓	✓	✓	✓	✓	✓	✓	✓
19	Adjust the action plan for environmentally sound disposal based on inventory investigation results		✓	✓	✓	✓	✓	✓	✓	✓	✓
20	B. Strategies to identify POPs stockpiles, articles in use and wastes										
21	Action 1 Improve the dynamic database system for POPs stockpiles and wastes	State Environmental Protection Administration, together with related departments									
22	Improve database subsystems for POPs stockpiles and wastes under the information system based on requirements for information gathering, processing and reporting		✓	✓	✓	✓					
23	Action 2 Identify pesticide POPs stockpiles and wastes	State Environmental Protection Administration, together with related departments									
24	Complete the field investigation and monitoring of identified and unidentified pesticide POPs stockpiles		✓	✓	✓	✓					

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
	and wastes, in pilot provinces, and update inventories										
25	Complete the nationwide investigation and monitoring of pesticide POPs stockpiles and wastes		✓	✓	✓	✓	✓	✓	✓	✓	✓
26	Action 3 Identify wastes containing PCBs	State Environmental Protection Administration, together with State Electricity Regulatory Commission									
27	Determine the first-stage nationwide inventory of PCB-containing wastes		✓	✓	✓	✓					
28	Determine the second-stage nationwide inventory of PCB-containing wastes		✓	✓	✓	✓	✓	✓	✓	✓	✓
29	Determine the third-stage nationwide inventory of PCB-containing wastes		✓	✓	✓	✓	✓	✓	✓	✓	✓
30	Action 4 Identify wastes containing dioxin	State Environmental Protection Administration together with related departments									
31	Establish an information system for the declaration of dioxin wastes for major controllable sources		✓	✓	✓	✓	✓	✓	✓	✓	✓
32	Gradually establish dynamic inventories of dioxin wastes		✓	✓	✓	✓	✓	✓	✓	✓	✓
33	C. Actions and measures to properly manage POPs stockpiles and dispose of articles containing POPs currently in use										
34	Action 1 Appropriately manage POPs stockpiles	State Environmental Protection Administration, together with related departments									
35	Rigorously control and appropriately dispose of identified POPs stockpiles as soon as possible		✓	✓	✓	✓	✓	✓	✓	✓	✓
36	Action 2 Identify and effectively manage products or articles in use containing pesticide POPs	State Environmental Protection Administration, together with Ministry of Commerce and other related departments									

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
37	Conduct complete investigation and identification of products or articles in use containing pesticide POPs and evaluate the content of pesticide POPs		✓	✓	✓	✓	✓	✓	✓	✓	✓
38	Take measures for the control of POPs releases in pesticide POPs products or articles in use, by taking into consideration the circumstances		✓	✓	✓	✓	✓	✓	✓	✓	✓
39	Action 3 Appropriately manage and dispose of PCB-containing electrical equipment in stock										
40	Evaluate, and manage in an environmentally sound manner, the clean-up and eventual disposal of PCB-containing electrical equipment in stockpiles	State Electricity Regulatory Commission, together with State Environmental Protection Administration	✓	✓	✓	✓	✓	✓	✓	✓	✓
41	Properly manage and maintain useful PCB-containing electrical equipment in stock	State Electricity Regulatory Commission	✓	✓	✓	✓	✓	✓	✓	✓	✓
42	D. Strategies for the identification and environmentally sound management of POPs contaminated sites	State Environmental Protection Administration, together with related departments									
42	Action 1 Establish an environmentally sound management system for POPs-contaminated sites and soils										
44	Establish a system for the identification, evaluation and collection of information on POPs-contaminated sites		✓	✓	✓	✓					
45	Establish institutional and regulatory systems for the environmentally sound management and remediation of POPs-contaminated sites		✓	✓	✓	✓	✓	✓	✓	✓	✓
46	Improve the supervisory and management capacity of related management organs for POPs-contaminated sites		✓	✓	✓	✓	✓	✓	✓	✓	✓
47	Action 2 Develop and implement strategies for the identification of POPs-contaminated sites										

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
48	Improve inventories of existing pesticide POPs-contaminated sites		✓	✓	✓	✓	✓	✓	✓	✓	✓
49	Establish inventories of PCBs-contaminated sites in China		✓	✓	✓	✓	✓	✓	✓	✓	✓
50	Establish dynamic inventories of dioxin-contaminated sites		✓	✓	✓	✓	✓	✓	✓	✓	✓
51	Action 3 Develop strategies for the environmentally sound remediation of POPs-contaminated sites										
52	Develop a long-term action plan for the environmentally sound remediation of POPs-contaminated sites		✓	✓	✓	✓	✓	✓	✓	✓	✓
53	Carry out risk evaluations of POPs-contaminated sites		✓	✓	✓	✓	✓	✓	✓	✓	✓
54	Launch as appropriate a demonstration on remediation of contaminated sites		✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 3-15 Action plan for monitoring

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Action 1 Establish and improve a POPs monitoring system	State Environmental Protection Administration, Ministry of Health, and other related departments									
2	Establish and improve environmental and hygienic standard monitoring methods and related systems		✓	✓	✓	✓					
3	Carry out demonstration activities on monitoring, replenish instruments and equipment of related monitoring stations, and provide training of personnel		✓	✓	✓	✓	✓	✓	✓	✓	✓
4	Begin to establish a national dioxin monitoring system		✓	✓	✓	✓					
5	Develop annual plans and long-term plans for POPs monitoring, and put into effect monitoring tasks and implementation costs		✓	✓	✓	✓					
6	Action 2 Monitor release sources of POPs	State Environmental Protection Administration									
7	Place emphasis on monitoring of releases from POPs production enterprises		✓	✓	✓	✓					
8	Stress the monitoring of burying sites and areas around PCB-containing equipment out of service		✓	✓	✓	✓	✓	✓	✓	✓	✓
9	Conduct monitoring of release sources and pollution around selected key industries and enterprises with dioxin releases,		✓	✓	✓	✓	✓	✓	✓	✓	✓
10	Action 3 Monitor the presence and levels of POPs in environmental media and organisms	State Environmental Protection Administration, together with related departments									
11	Monitor trends in POPs concentrations in the air by stages and by regions		✓	✓	✓	✓	✓	✓	✓	✓	✓

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
12	Monitor concentration changes of POPs in soils		✓	✓	✓	✓	✓	✓	✓	✓	✓
13	Monitor concentration changes of POPs in water bodies		✓	✓	✓	✓	✓	✓	✓	✓	✓
14	Monitor concentration changes of POPs in organisms		✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Action 4 Monitor POPs-contaminated sites	State Environmental Protection Administration									
16	Monitor and investigate contaminated sites			✓	✓	✓	✓	✓	✓	✓	✓
17	Monitor POPs content of contaminated sites as well as of environmental media and ground water from their ambient environment			✓	✓	✓	✓	✓	✓	✓	✓
18	Establish an inventory of key contaminated sites							✓	✓	✓	✓
19	Action 5 Monitor POPs content in agricultural products, food and drinking water	State Environmental Protection Administration, Ministry of Agriculture, Ministry of Health and Ministry of Construction									
20	Carry out activities of monitoring POPs in agricultural products, food and drinking water		✓	✓	✓	✓	✓	✓	✓	✓	✓
21	Action 6 Monitor residual body concentrations of POPs in key groups exposed to POPs and in ordinary residents	Ministry of Health, together with State Environmental Protection Administration and other related departments									
22	Carry out monitoring activities for key groups		✓	✓	✓	✓	✓	✓	✓	✓	
23	Conduct spot-checks on ordinary groups		✓	✓	✓	✓	✓	✓	✓	✓	
24	Compile monitoring analysis report on human exposure to POPs levels										✓

Table 3-16 Action plan for research and development

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Action 1 Carry out studies of POPs transport and transformation behavior	Ministry of Science and Technology, together with departments concerned									
2	Study the characteristics, historical evolution and trends in POPs pollution in typical regions of China			✓	✓	✓					
3	Carry out research on typical release modes for POPs and patterns of transport, and establish appropriate models describing movements of POPs			✓	✓	✓					
4	Carry out research on presence, state and environmental fate of POPs in highly contaminated sediments			✓	✓	✓					
5	Carry out research on the transport and enrichment mechanism of POPs through food chains as well as their biological effects					✓	✓	✓	✓	✓	✓
6	Action 2 Carry out studies of physical exposure to POPs and risk evaluation of POPs impacts on the ecological environment and human health	Ministry of Science and Technology, Ministry of Health and State Environmental Protection Administration, together with departments concerned									
7	Study biological indicators that reflect environmental exposure to POPs			✓	✓	✓	✓	✓			
8	Study the dose-effect relationships with regard to the impacts of POPs exposure on the environment and human health			✓	✓	✓	✓	✓			
9	Establish a standard system for the safety assessment of POPs impacts on human health			✓	✓	✓	✓	✓			
10	Study the formation and impacts of zones of water bodies severely contaminated by POPs			✓	✓	✓	✓	✓			
11	Conduct exposure simulation and model study					✓	✓	✓	✓	✓	✓

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
12	Study ecological risks of POPs in soils					✓	✓	✓	✓	✓	✓
13	Study environmental benefit and cost analysis		✓	✓	✓	✓					
14	Action 3 Carry out development of POPs monitoring methods	Ministry of Science and Technology and State Environmental Protection Administration, together with departments concerned									
15	Develop various methods for monitoring of POPs, for instance, quick and ultra-trace monitoring methods, and make research on standard samples		✓	✓	✓	✓					
16	Action 4 Conduct analysis and study of technical and economic costs for BAT/BEP activities	National Development and Reform Commission and State Environmental Protection Administration									
17	Carry out the evaluation of BAT/BEP and the analysis of costs		✓	✓	✓	✓	✓	✓	✓	✓	
18	Action 5 Carry out development of POPs alternatives/alternative technologies	Ministry of Science and Technology, together with State Environmental Protection Administration and related departments and industrial organizations									
19	Evaluate and develop POPs alternatives/alternative technologies		✓	✓	✓	✓	✓	✓	✓	✓	✓
20	Action 6: Carry out development of waste disposal technologies and dioxin reduction technologies	Ministry of Science and Technology, together with State Environmental Protection Administration and related departments									

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
21	Develop technologies for disposal of POPs wastes		✓	✓	✓	✓	✓	✓	✓	✓	✓
22	Develop technologies for the prevention, reduction and control of POPs releases		✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 3-17 Action plan for promoting information exchange of parties concerned

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Promote information exchange for concerned parties	State Environmental Protection Administration and related departments									
2	Strengthen capacity of the national Convention implementation information management center				✓	✓	✓	✓	✓	✓	✓
3	Collect, sort and summarize relevant domestic basic information, and track corporate behavior relating to POPs, the implementation of Convention implementation activities, and the development and implementation of relevant policies, programmes and strategies.				✓	✓	✓	✓	✓	✓	✓
4	Submit to the Secretariat of the Convention, the information required by the Convention to be declared and reported with regard to the production, use, release, etc. of POPs								✓	✓	✓
5	Give publicity to POPs knowledge, progress in Convention implementation and policies via the website <i>China's POPs Actions for Convention Implementation</i> (www.china-pops.org), and release relevant information on Convention implementation		✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Encourage industrial departments to use network resources to disseminate and release relevant information.		✓	✓	✓	✓	✓	✓	✓	✓	✓
7	Regularly organize the forum on implementation of the Convention to facilitate the exchange and communication between the government, related enterprises and the public		✓	✓	✓	✓	✓	✓	✓	✓	✓
8	Compile and publish scientific research findings and summaries of practice and experience relating to the implementation of the Convention, as well as relevant materials and information		✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 3-18 Action plan for public information

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Public information, awareness and education	State Environmental Protection Administration and related departments									
2	Develop educational, public awareness and training programmes, giving consideration to <i>Outline of Actions for Nationwide Environmental Awareness and Education</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Produce TV programs and compile and publish educational, public awareness and training materials		✓	✓	✓	✓	✓	✓	✓	✓	✓
4	Carry out training for policy and decision makers at the central and local levels regarding requirements and measures for Convention implementation, to strengthen decision making and management capacity for POPs		✓	✓	✓	✓	✓	✓	✓	✓	✓
5	Carry out workshops by industry and region on POPs alternatives, alternative technologies and release control technologies		✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Launch training activities on safety in production to workers directly exposed to POPs		✓	✓	✓	✓	✓	✓	✓	✓	✓
7	Pass on to specific groups the knowledge about POPs and provide them with practicable self-protection skills		✓	✓	✓	✓	✓	✓	✓	✓	✓
8	Carry out educational and training activities for students, women and children		✓	✓	✓	✓	✓	✓	✓	✓	✓
9	Pass on POPs-related knowledge to specific groups in regions with relatively intensive releases of POPs who are likely to be affected, and provide them with training on practicable daily protection and self-help measures in case of emergencies		✓	✓	✓	✓	✓	✓	✓	✓	✓
10	Hold hearings, promote the public participation in decision making, and encourage the public to participate in Convention implementation activities		✓	✓	✓	✓	✓	✓	✓	✓	✓

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
11	Disseminate POPs-related knowledge to the public		✓	✓	✓	✓	✓	✓	✓	✓	✓
12	Set a special window on the website <i>China's POPs Actions for Convention Implementation</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓
13	Strengthen the design of activities for environmental protection in rural areas, and carry out educational and public awareness activities relating to prevention of POPs hazards		✓	✓	✓	✓	✓	✓	✓	✓	✓
14	Encourage non-government organizations to play role in public awareness and supervision		✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Carry out reward activities, and commend examples that can significantly contribute to eliminating, reducing and preventing POPs hazards		✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 3-19 Action plan for effectiveness evaluation, reporting and financial assistance

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Actions for evaluation of effectiveness	State Environmental Protection Administration and related departments									
2	Fully investigate monitoring activities that have been carried out on POPs concentrations in breast milk, blood and air		✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Seek financial and technical assistance to strengthen the capacity of China for implementing the Global Environment Monitoring System (GEMS); develop monitoring plans for effectiveness evaluation of implementation of the Convention; and organize on a periodic basis, the monitoring and evaluation pursuant to requirements of the Convention and to decisions by the Conference of the Parties		✓	✓	✓	✓	✓	✓	✓	✓	✓
4	Gradually establish a system for collecting and reporting the scientific, environmental, technical and economic information that reflects progress of China in the implementation of the Convention		✓	✓	✓	✓	✓	✓	✓	✓	✓
5	Submit on a periodic basis to the Secretariat of the Convention the POPs monitoring reports, national reports and information on non-compliance		✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Reporting										
7	Gather data on production of DDT, HCB, chlordane and mirex, and submit such data to NCG before June 30 each year	National Development and Reform Commission	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	Gather data on use and stockpile of DDT, HCB, chlordane and mirex, and submit such data to NCG before June 30 each year	State Environmental Protection Administration, together with Ministry of Agriculture, Ministry of Health, General Administration of Quality Supervision, Inspection and	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
		Quarantine and other related departments									
9	Gather data on import and export of DDT, HCB, chlordane and mirex, and submit such data to NCG before June 30 each year	General Administration of Customs	✓	✓	✓	✓					
10	Investigate PCB-containing equipment in use, and submit results of the investigation to NCG in the form of a written report	State Electricity Regulatory Commission	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	Carry out evaluation of their respective policies, laws, regulations and departmental rules pertaining to Convention implementation that they have formulated or have taken the lead to formulate and of the implementation of such policies, rules and regulations, and submit their evaluation reports to NCG	Related departments of the State Council	✓	✓	✓	✓	✓	✓	✓	✓	✓
12	Gather relevant materials and data, organizing the development of drafts of the national report and submitting them to NCG for review	State Environmental Protection Administration	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	Technical and financial assistance	State Environmental Protection Administration and related departments									
14	Organize the research and determination of China's priority areas for technical assistance and technology transfer in the near future and in the following medium and long terms		✓	✓							
15	Propose to the relevant conferences and agencies of the Convention the requests for technical assistance and technology transfer		✓	✓	✓	✓	✓	✓	✓	✓	✓
16	Search for and promotion of bilateral and multilateral technical assistance and technology transfer through South-South Cooperation and South-North Cooperation		✓	✓	✓	✓	✓	✓	✓	✓	✓
17	Timely updating of priority areas of China that need technical assistance and technology transfer		✓	✓	✓	✓	✓	✓	✓	✓	✓
18	Gradually define and update priorities and financial requirements for reducing, eliminating and preventing releases of POPs		✓	✓	✓	✓					

	Specific actions	Implementation Body	2007	2008	2009	2010	2011	2012	2013	2014	2015
19	Gradually establish and improve laws, regulations, specifications and guidelines relating to financial mechanisms for Convention implementation		✓	✓	✓	✓	✓	✓	✓	✓	✓
20	Organize and promote domestic activities pertaining to technology transfer		✓	✓	✓	✓	✓	✓	✓	✓	✓
21	Include the financial mechanisms into the long-term, effective mechanism for reducing and controlling POPs		✓	✓	✓	✓	✓	✓	✓	✓	✓

3.6 Financial requirements and arrangements

Funds required to implement the near-term and mid-term (2006-2015) goals of the National Implementation Plan include:

- (1) expenses and incremental costs for phasing out production of pesticide POPS (including loss of profit, unemployment compensation, equipment dismantling expenses and expenses for remediation of contaminated sites);
- (2) expenses and incremental costs associated with using alternatives for pesticide POPs (including expenses for introduction, alternative equipment, operation, and promotion and training relating to the use of alternatives);
- (3) expenses and incremental costs associated with phasing out PCBs-containing electrical equipment in use (including expenses for inventorying, labelling, dismantling, replacement, clean-up and transport, disposal, etc.);
- (4) expenses and incremental costs associated with adopting BAT/BEP to control unintentionally produced POPs releases (including expenses for release validation, technical design, technical innovation, operation, etc)
- (5) expenses and incremental costs associated with the investigation and disposal of obsolete and contaminated sites (including expenses for investigation, inventory making, labelling, clean-up and transport, disposal, etc.);
- (6) technical assistance expenses and incremental costs associated with capacity building for management (personnel, information collection and dissemination, policy making), monitoring, alternative technology, data acquisition (production, use and abandonment) and reporting, and disposal of wastes and contaminated sites; and
- (7) based on planned activities, expenses required to implement the National Implementation Plan are estimated as follows pursuant to Article 13 and Article 14 and GEF funding principles. The aforementioned activities that China needs to carry out pursuant to the requirements under the Convention on POPs reduction and control are summarized in Table 3-20.

Table 3-20 **Phase-out expenses and incremental costs requirements**³²

Section No.	Specific actions	Aggregate expense (RMB 1,000)	Incremental cost ³³ (RMB 1,000)	Baseline cost ³⁴ (RMB 1,000)
3.3.1	Strengthening of institutional capacity and policy and regulatory building	375,550	112,665	262,885
3.3.2	Measures to reduce or eliminate releases from intentional production or use			
3.3.3	Actions to reduce or eliminate intentionally produced and used	463,798	194,795	269,002

³² Adopt prices in 2006.

³³ Incremental cost: the difference between the expenditure on the activity to implement international environmental conventions and the cost of the activity it replaces or makes redundant. It is the measurement of the economic burden a country will shoulder for carrying out activities beyond its national benefits.

³⁴ Baseline: cost of the original activity estimated for calculation of the incremental cost.

Section No.	Specific actions	Aggregate expense (RMB 1,000)	Incremental cost ³³ (RMB 1,000)	Baseline cost ³⁴ (RMB 1,000)
	pesticide POPs (Chemicals listed in Part 1 of Annex A under the Convention)			
3.3.4	Actions to identify, eliminate and manage, in an environmentally sound way, PCBs-containing electrical equipment in use	103,140	30,942	72,198
3.3.5	Actions to eliminate and restrict production, use, import and export of DDT	616,173	258,792	357,380
3.3.6	Actions on specific exemptions	2,700	810	1,890
3.3.7	Actions to reduce and eliminate Dioxin releases	28,312,210	11,820,387	16,491,823
3.3.8	Actions and measures to reduce releases from POPs stockpiles and wastes	2,154,228	904,701	1,249,527
3.3.9	Strategies to identify POPs stockpiles, articles in use and wastes	139,500	58,590	80,910
3.3.10	Actions and measures to properly manage POPs stockpiles and to dispose of POPs-containing articles in use	69,750	29,295	40,455
3.3.11	Strategies for the identification and environmentally sound management of POPs-contaminated sites	1,800	756	1,044
3.3.12	Promotion of information exchange for concerned parties	11,700	3,510	8,190
3.3.13	Public information, awareness and education	30,400	9,120	21,280
3.3.14	Effectiveness evaluation actions	2,000	600	1,400
3.3.15	Reporting	2,700	810	1,890
3.3.16	Monitoring, research and development	1,617,404	485,221	1,132,182

Section No.	Specific actions	Aggregate expense (RMB 1,000)	Incremental cost³³ (RMB 1,000)	Baseline cost³⁴ (RMB 1,000)
3.3.17	Technical and financial assistance	10,050	3,015	7,035
Total		33,915,105	13,914,011	20,001,094

According to the aforesaid phase-out strategies and arrangements for fulfilling the strategies, expenses and incremental costs for China to implement the National Implementation Plan are shown in the above table. In addition, the funding principle for capacity building for monitoring, disposal and alternative technology is not yet explicit enough, and it is not completely reflected in expense estimates for the National Implementation Plan.

Taking into consideration the GEF funding principles and the financial mechanism requirements under the Stockholm Convention, expenses for the above Convention implementation activities are as follows: except for various capacity building activities, 40% of the total expenses for the other Convention implementation activities are incremental costs, and pursuant to Article 5 of the *Law on the Prevention and Control of Environmental Pollution by Solid Wastes*, the portion of non-incremental costs will be borne by the state and relevant enterprises or individuals.

Funds for the implementation of the National Implementation Plan are mainly from central and local finances, corporate and private funds, and multilateral/bilateral funds.

With the adding of new POPs to the Stockholm Convention, as well as the updating and supplementation of the National Implementation Plan in the future, the aforesaid expenses and all incremental costs associated with POPs control will also be updated and supplemented.

Annex 1: Current policies and analysis of requirements for the implementation of the Stockholm Convention

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
<p>Article 3 Measures to reduce or eliminate releases from intentional production and use</p>	<p>Aldrin, dieldrin, endrin, heptachlor, toxaphene.</p> <p>Prohibit intentional production, use, import and export</p>	<p>China had stopped the production, use, import and export of these POPs.</p> <p>Production management: <i>Guiding Catalogue of Industrial Structure Regulation</i> only lists heptachlor as a product that shall be phased out.</p> <p>Use management: The <i>Public Notice No.199</i> by Ministry of Agriculture prohibits explicitly the use of toxaphene, aldrin and dieldrin. Heptachlor has never been approved to be registered and used as a pesticide, and endrin has never been developed or produced.</p> <p>Import and export management: The <i>List of Toxic Chemicals Banned or Severely Restricted in the People's Republic of China</i> has already listed aldrin, dieldrin, endrin and</p>		<p>All these chemicals shall be included in the <i>Guiding Catalogue of Industrial Structure Regulation</i>.</p> <p>Toxaphene shall be included in the <i>List of Toxic Chemicals Banned or Severely Restricted in the People's Republic of China</i>.</p> <p>Environmental quality standards on surface water, groundwater, soil, etc.: there is a lack of relevant indicators.</p>	<p>Include aldrin, dieldrin, endrin and toxaphene in the products of the <i>Guiding Catalogue of Industrial Structure Regulation</i> that shall be phased out.</p> <p>Add toxaphene to the <i>List of Toxic Chemicals Banned or Severely Restricted in the People's Republic of China</i>.</p> <p>Develop and revise environmental quality standards on soil, groundwater and surface water.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
		<p>heptachlor as toxic chemicals for which import and export are banned.</p> <p>Registration management: The <i>List of Hazardous Chemicals</i> has already listed heptachlor, aldrin, dieldrin, endrin and toxaphene as hazardous chemicals that shall be registered.</p>			
	<p>HCB, chlordane and mirex</p> <p>Restrict the production, use, import and export of HCB, chlordane and mirex, which have specific exemptions, and control their release into the environment.</p>	<p>Production management: The <i>Guiding Catalogue of Industrial Structure Regulation</i> has already listed chlordane as a product that shall be phased out; HCB and mirex will be phased out pursuant to Convention implementation plans.</p> <p>Use management: Not used or registered in agriculture.</p> <p>Registration management: The <i>List of Dangerous Goods</i> and the <i>List of Hazardous Chemicals</i> have</p>		<p>Environmental quality standards on surface water, groundwater, soil, etc.; there is a lack of relevant indicators.</p> <p>Lack of relevant standards on pollutant releases.</p> <p>Hygienic standards on food, crop, occupational health, etc.: also there is a lack of control indicators for POPs pesticides.</p>	<p>Include alternative production processes for chlordane and mirex in the encouraged category of the <i>Guiding Catalogue of Industrial Structure Regulation</i>.</p> <p>Strengthen management of their uses and releases, and carry out management of the purposes that present regulations cannot cover. For example, they can only be used for specific exemptions for which release control standards will be developed or revised. Conduct research on related supporting policies aimed at control of quota and exempted</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
		<p>already listed chlordane and mirex.</p> <p>Import and export management: The <i>List of Toxic Chemicals Banned or Severely Restricted in the People's Republic of China</i> (1st and 2nd group) has already listed the three POPs as products banned or severely restricted in terms of import and export, for which the PIC verification system is executed.</p> <p>Environmental management: Only HCB is included in the organic pollutant concentration standards under the <i>Environmental Quality Standard for Surface Water</i> (GHZB1-1999) currently enforced by the state</p>			<p>purposes. Revise and develop hygienic standards relating to food and health.</p> <p>List HCB in the <i>List of Hazardous Chemicals</i> and the <i>List of Dangerous Goods</i> (See paragraph 3.3.1 of the National Implementation Plan).</p> <p>Strengthen enforcement and supervision.</p>
	<p>DDT</p> <p>Address separately DDT for specific exemptions and DDT for acceptable</p>	<p>Production management: The General Office of the State Council released a document in 1991, stating that DDT would be</p>		<p>Specific requirements on DDT shall be defined in the <i>Guiding Catalogue of Industrial Structure Regulation</i>.</p>	<p>Revise, on a timely basis, the <i>Catalogue of Industrial Structure Regulation</i>, and list DDT as a product that shall be phased out pursuant to</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
	purposes, such as for control of disease vectors.	<p>produced by designated enterprises and new projects would not be ratified any longer; and production and use of DDT as a pesticide has been stopped; the <i>Guiding Catalogue of Industrial Structure Regulation</i> has already listed DDT as a product that shall be phased out pursuant to Convention implementation requirements.</p> <p>Use management: The former Ministry of Chemical Industry stipulated in 1995 that DDT can only be used as a pesticide for hygienic purposes and as an intermediate; the <i>Guiding Catalogue of Industrial Structure Regulation</i> prohibits its use in paint.</p> <p>Registration management: DDT has already been listed in the <i>List of Hazardous Chemicals</i>, which shall be</p>		<p>Environmental quality standards are not complete.</p> <p>Lack of standards on DDT releases.</p>	<p>Convention implementation requirements.</p> <p>On the basis of evaluation of the existing control standards, develop or revise DDT pollution control standards, including its residues and releases into the environment.</p> <p>Revise environmental quality standards, DDT release standards, and hygienic standards on food, health, etc.</p> <p>Strengthen supervision and management.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
		<p>registered pursuant to regulations.</p> <p>Import and export management: the <i>List of Toxic Chemicals Banned or Severely Restricted in the People's Republic of China</i> (1st group) has already listed DDT as a product restricted in terms of import and export, for which PIC is executed.</p> <p>Environmental management: There are some control standards for DDT at present, and there are provisions in the <i>Environmental Quality Standard for Surface Water</i> and <i>Environmental Quality Standard for Soils</i>.</p> <p>Pollution control: DDT has been listed in the <i>National Catalogue of Hazardous Wastes</i>, and shall be disposed of pursuant to relevant hazardous waste standards after becoming obsolete.</p>			

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
		<p>Departmental management rules and regulations relating to pesticide POPs include:</p> <ul style="list-style-type: none"> • <i>Regulations on Safety Management of Hazardous Chemicals</i> • <i>Regulations on Pesticide Management</i> • <i>Management Measures for Registration of Hazardous Chemicals</i> • <i>Measure for Manifest Management on Transfer of Hazardous Wastes</i> • <i>Regulations on Environmental Management of the First Import of Chemicals and the Import and Export of Toxic Chemicals</i> • <i>Measures for the Administration of Operating Licenses for Hazardous Chemicals</i> • <i>Management Regulations on the Prevention and Control of Termites for Urban Buildings</i> • <i>Management Rules for</i> 	<p>There have been definite stipulations in the legal system regarding control of production and use, import and export, pollution, etc.</p> <p>Pesticide POPs currently produced and used, are not used in agricultural production.</p> <p>Management shall be strengthened on pesticide POPs in use, which are not registered for pesticide production.</p>	<p>Lack of technology policies guiding research and development of alternatives (for instance, lack of economically appropriate mirex alternatives).</p> <p>Links to industrial policies of the state shall be strengthened.</p> <p>Pesticide POPs shall be incorporated into the management of hazardous wastes.</p>	<p>Revise and develop sound environmental quality standards for surface water, groundwater, soil, etc., and improve stipulations on pesticide POPs.</p> <p>Revise the <i>Guiding Catalogue of Industrial Structure Regulation</i> according to the aforesaid requirements.</p> <p>Technology policies shall place emphasis on encouraging research and development for alternative technologies. Include pesticide POPs into the <i>National Catalogue of Hazardous Wastes</i>.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
		<p><i>Railway Transportation of Hazardous Goods</i></p> <ul style="list-style-type: none"> • <i>Guiding Catalogue of Industrial Structure Regulation</i> 			
	<p>Polychlorinated biphenyls (PCBs)</p> <p>Investigate and identify PCBs-containing equipment in use and eliminate PCBs contained therein by 2025.</p> <p>Carry out effective environmental management of PCBs-containing equipment in use.</p> <p>Prohibit import of PCBs-containing equipment.</p> <p>Carry out the environmentally sound management of PCBs-containing equipment by 2028.</p> <p>Submit a progress report on elimination of PCBs every 5</p>	<p>Production management: The <i>Guiding Catalogue of Industrial Structure Regulation</i> (2005) has already listed PCBs as a product that shall be phased out; departments concerned had promulgated in 1974 regulations to prohibit the production of PCBs-containing capacitors.</p> <p>Import and export management: The <i>List of Toxic Chemicals Banned or Severely Restricted in the People's Republic of China</i> (1st group) has already listed PCBs as a toxic chemical for which import and export are prohibited; departments concerned have prohibited, by explicit order, the import of PCBs-containing electrical equipment in</p>	<p>Management institutions in the power sector responsible for equipment such as capacitors are explicit, while management institutions for equipment used in other sectors are implicit.</p>	<p>No relevant management regulation has been made on PCBs used for other purposes such as paint and ink.</p> <p>Systems for registration management, pollution monitoring, maintenance and supervision and relevant management mechanisms have not been established and maintained for sites of, and temporarily sealing of, PCBs-containing equipment.</p> <p>Management systems for declaration, registration and information updating have not been established and maintained for pollution sources in power and other industries with</p>	<p>Pursuant to PCBs strategies, determinate when to comprehensively phase out PCBs-containing electrical equipment and promulgate, on a timely basis, the relevant policies and regulations.</p> <p>Revise and complement the <i>Regulations on Preventing PCBs-containing Electrical Equipment and Their Wastes from Polluting the Environment</i>.</p> <p>Revise and complement relevant PCBs indicators in related environmental quality standards, and standards for overall releases of pollutants.</p> <p>After having carried out evaluation of implementation effects of the regulations promulgated in 1991, further</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
years.	<p>1991.</p> <p>Registration management: The <i>Notice on Reporting Nationwide PCBs-containing Electrical Equipment and Status of Their Wastes</i> issued in 1991 stipulated that PCBs-containing electrical equipment shall be declared; the <i>Notice with Regard to Further Carrying Out the Work on Inventory Investigation of PCBs-containing Electrical Equipment</i> was released in 2005.</p> <p>Environmental management: Departments concerned had set forth in 1991 the definite environmental management requirements on PCBs-containing electrical equipment (in use and out of service), released the <i>Regulations on Preventing PCBs-containing Electrical Equipment and Their Wastes</i></p>	<p>uses of PCBs-containing equipment.</p> <p>Lack of regulations and guidelines on the environmentally sound management of PCBs wastes regarding disposal technologies, monitoring, facilities, etc.</p>	<p>improve the registration system for PCBs-containing electrical equipment in use, as well as the environmental management system on PCBs-containing electrical equipment.</p> <p>After having determined technological approaches for disposal, formulate relevant treatment and disposal management methods aimed at PCBs-containing electrical equipment that is out of service.</p> <p>Develop or revise specifications and technical guidance on clean-up, collection, storage, transportation, disposal, monitoring, etc. of PCBs wastes.</p>		

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
		<p><i>from Polluting the Environment, and promulgated Pollution Control Standard for PCBs-containing Wastes, Pollution Control Values on PCBs-containing Water and Soils (Interim), etc.</i></p> <p>Pollution Control: List them in the <i>National Catalogue of Hazardous Wastes</i>, and conduct disposal pursuant to hazardous waste standards after they become obsolete.</p>			
4. Register of specific exemptions	Specific exemptions				This has been considered in Article 3.
5. Measures to reduce or eliminate releases from unintentional production	<p>Dioxin</p> <p>Policy and legal guarantee for the implementation of actions plans on dioxin under the National Implementation Plan.</p> <p>Implement BAT for new sources prior to 11 November 2008.</p>	<p>Dioxin has already been listed in the <i>National Catalogue of Hazardous Wastes</i>.</p> <p>The state has promulgated the <i>Environmental Impact Assessment Law</i> and the <i>Catalogue of Systematic Management of Building Projects for Environmental</i></p>	<p>Except for incinerators, the environmental assessment system has not included dioxin into indicators for environment assessment.</p> <p>Compulsory cleaner</p>	<p>Lack of technical support documents for the environmental impact assessment of dioxin control.</p> <p>Lack of control policies for key industries.</p> <p>Lack of pollution control standards on (new and old)</p>	<p>Improve technical support documents for the environmental impact assessment of new sources in key industries by 2008.</p> <p>Establish and improve release standards on new sources in order to meet the needs for implementing BAT for new sources.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
	Adopt BAT/BEP, or respond to requirements of BAT/BEP in the form of release limits, to control dioxin releases.	<p><i>Protection</i>; the system for environmental impact assessment is a primary environmental protection policy giving priority to pollution prevention.</p> <p>Pursuant to the <i>Law on Promotion of Cleaner Production and Provisional Measures for Cleaner Production Audit</i>, compulsory cleaner production audits shall be implemented on enterprises with releases of toxic substances (including dioxin) in production.</p> <p>The <i>Technology Policy for the Prevention and Control of Pollution Caused by Hazardous Wastes</i> (No.199, SEPA [2001]) sets forth specific requirements for incineration facilities for hazardous wastes, based on the general principle of reducing their amount, transforming them into resources and disposing of</p>	<p>production audit has been effectively carried out.</p> <p>The compulsory phase-out system has not been completely implemented.</p>	<p>release sources.</p> <p>Links to policies on national industrial structure regulation shall be strengthened.</p> <p>National financial support for technological innovation shall be strengthened to encourage research and development of technologies for reduction of dioxin releases.</p> <p>Lack of incentive mechanisms for release reduction actions.</p>	<p>Revise the <i>Guiding Catalogue of Industrial Structure Regulation</i>, listing outdated processes and equipment liable to produce dioxin in the ‘eliminated’ or ‘restricted’ category, and processes and equipment not liable to produce dioxin in the ‘encouraged’ category.</p> <p>Promulgate BAT/BEP guidance by 2010.</p> <p>Develop or revise release control standards for key industries by 2010.</p> <p>Intensify the enforcement, phase out outdated processes and equipment in a determined manner, and close or suspend relevant illegal enterprises.</p> <p>Develop technology policies to promote technological innovation for release reduction and control.</p> <p>Establish incentive mechanisms</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
		<p>them in an environmentally sound manner.</p> <p>The <i>Guiding Catalogue of Industrial Structure Regulation</i> (2005) lists “Technological development and application for reducing and controlling dioxin releases” in “Category I – Encouraged Category”.</p> <p>A number of standards have been promulgated, including:</p> <ul style="list-style-type: none"> • <i>Pollution Control Standard for Hazardous Wastes Incineration</i> (GB18484-2001) • <i>Pollution Control Standard for Landfilling of Hazardous Wastes</i> (GB18598-2001) • <i>Standard for Pollution Control on Hazardous Waste Storage</i> (GB18597-2001) • <i>Pollution Control Standard for Incineration</i> 			to encourage enterprises to reduce releases voluntarily.

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
		<p><i>of Domestic Wastes</i> (GB18485-2001)</p> <ul style="list-style-type: none"> • <i>Emission Standard for Air Pollutants for Cement Industry</i> (GB4915-2004) • <i>Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant</i> (GB18918-2002). 			
<p>6. Measures to reduce or eliminate releases from stockpiles and wastes</p>	<p>Stockpiles</p> <p>Identify stockpiles</p> <p>Manage stockpiles in a proper manner</p> <p>Handle, collect, transport and store in an environmentally sound manner.</p> <p>Such wastes shall not be recovered or reused.</p> <p>Transport across international boundaries without taking into account relevant international rules shall not be permitted.</p>	<p>Main applicable regulations include:</p> <ul style="list-style-type: none"> • <i>Regulations on Safety Management of Hazardous Chemicals</i> (2002); • <i>Regulations on Pesticide Management</i> (2001) and <i>Implementation Methods for the Regulations on Pesticide Management</i> (2002); and • <i>Methods for Prevention and Control of Environmental Pollution by Hazardous Chemicals</i> (2005). 	<p>Stockpiles of POPs chemicals are hazardous chemicals. China has always respected hazardous chemicals, and relevant policies are well executed.</p>	<p>At present, stockpiles of POPs chemicals in China basically belong to their original producers; POPs stockpiles were not found in the pre-phase investigation in the area of distribution, mainly because they were banned for use in China as early as in 1980.</p> <p>Relevant management requirements shall be issued for stockpiles within production enterprises.</p>	<p>Issue specific management measures or stipulations for production enterprises.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
	Wastes	POPs wastes are defined as hazardous wastes in China.	POPs wastes management in	Identification methods are inadequate.	Develop methods for identification of wastes.
	Develop strategies for identification.	China has established a complete set of systems relating to hazardous wastes, including, declaration, transfer, transport, operation, disposal, labeling, etc.	China is still at the initial stage; situations on production of and pollution by POPs wastes are not well understood; they are not managed effectively.	POPs wastes in the existing lists of hazardous wastes and in identification standards are incomplete.	Revise <i>National Catalogue of Hazardous Wastes</i> , listing POPS wastes into it.
	Manage wastes in a proper manner.			Lack of technical requirements on environmentally sound management of various POPs with regard to their collection.	Revise the identification standard system and integrate POPs wastes in it.
	Handle, collect, transport and store wastes in an environmentally sound manner.	China has promulgated some pollution control standards on hazardous wastes, involving incineration, landfill, storage, etc.			Develop technical guidance for the environmentally sound management of POPs wastes, including technical requirements with regard to collection, packing, transport, storage, disposal, etc.
	Such wastes shall not be recovered or reused.			POPs wastes have not been listed in the list of wastes for which import is banned.	List POPs wastes into the list of wastes for which import and export are banned.
	Transport across international boundaries without taking into account relevant international rules shall not be permitted.	As for import and export of hazardous wastes, China has development management methods in accordance with requirements of the Basel Convention.		Lack of technical specifications relating to monitoring, sampling and sample making of POPs wastes; systems for standard methods, testing and evaluation are not well established.	Develop technical specifications on monitoring, sampling and sample making of POPs wastes, methods and standards, testing and evaluation systems.
				The declaration and	Develop management regulations on declaration and

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
				<p>registration systems for hazardous wastes have the following deficiencies:</p> <ul style="list-style-type: none"> • unclear scope of declaration and registration, • indefinite categories of declaration, • indefinite statistical indexes, • insufficient analysis and updating of data, and • no definite requirements for declaration of POPs wastes historically left over. <p>Lack of a set of methods and measures for emergency treatment and safety assurance aimed at characteristics of POPs wastes.</p> <p>Financial mechanisms in existing laws and regulations are ambiguous; according to financing channels in existing laws</p>	<p>registration of POPs stockpiles and wastes.</p> <p>Develop a guide on emergency management for environmental protection of POPs wastes.</p> <p>Develop economic and technology policies relating to the environmentally sound management and disposal of obsolete POPs.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
				and regulations, there still is a big gap in funds.	
	<p>Contaminated sites</p> <p>Develop strategies for identification</p>	<ul style="list-style-type: none"> • <i>Environmental Protection Law,</i> • <i>Law on the Prevention and Control of Environmental Pollution by Solid Wastes,</i> • <i>Land Management Law,</i> • <i>Regulations on Safety Management of Hazardous Chemicals,</i> • <i>National Catalogue of Hazardous Wastes,</i> • <i>Environmental Quality Standard for Surface Water and Environmental Quality Standard for Soils,</i> • <i>Quality Standard for Ground Water,</i> • <i>Technical Principles on the Environmental Impact Assessment of Facilities for Hazardous Wastes,</i> etc., <p>all involve principled requirements for land protection and contaminated sites management to a certain degree.</p>	<p>The work of environmental protection for contaminated sites has just started in China: a special law shall be developed to define management responsibility, input and prevention measures for contaminated sites.</p> <p>Laws of China have some principled stipulations for contaminated sites, but lack operable regulations.</p>	<p>Existing laws and regulations have no specific requirements for differences and links between solid wastes and contaminated sites and contaminated soils.</p> <p>Indicators in the environmental quality standard for soils are not complete.</p> <p>There are no standards for control and evaluation by categories and classifications of contaminated soils and sites.</p> <p>Lack of definite principles for sharing expenses to treat and dispose of the pollutants and sites historically left by enterprises that were closed, stopped, merged and/or shifted to another</p>	<p>Develop the <i>Measures for Environmental Management of Contaminated Sites.</i></p> <p>Develop the <i>Standard for Identification of Contaminated Sites</i> and the <i>Standard for Environmental Risk Assessment.</i></p> <p>Develop the <i>Environmental Quality Standard for Soils.</i></p> <p>Develop economic and technology policies relating to the environmentally sound management and disposal of POPs contaminated sites.</p> <p>Develop the <i>Standard for Acceptance on Management and Remediation of POPs Contaminated Sites.</i></p> <p>Conduct research on responsibilities and financial mechanisms for contaminated sites.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
7. Implementation plans	<p>Implementation plans Each Party shall develop and make an effort to implement its national implementation plan.</p> <p>Transmit the national implementation plan to the Conference of the Parties within two years of the date on which the Convention enters into force for it.</p> <p>Update the national implementation plan on a periodic basis and in a manner to be specified by a decision of the Conference of the Parties.</p> <p>Consult national stakeholders including, women's groups and groups involved in the health of children in order to facilitate the development, implementation and</p>			business, leaving some gaps in the law.	<p>Develop effective POPs management mechanisms</p> <p>Integrate POPs management into plans for national economic and social development and sustainable development strategies.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
	updating of the implementation plan. Integrate the national implementation plan in sustainable development strategies.				
9. Information exchange	<p>Information exchange</p> <p>Each Party shall facilitate or undertake the exchange of information relevant to the reduction or elimination of the production, use and release of persistent organic pollutants.</p> <p>Each Party shall facilitate or undertake the exchange of information relevant to alternatives to persistent organic pollutants, including information relating to their risks as well as to their economic and social costs.</p> <p>Each Party shall designate a national focal point for the exchange of the above-mentioned</p>	<p>A POPs Convention implementation office has been established.</p> <p>State Environmental Protection Administration is responsible for the exchange of information and for monitoring of environmental status.</p> <p>The Convention Implementation Office has published some public awareness materials and established a specialized website.</p>		<p>Disclosure of environmental information of POPs related enterprises is not adequate.</p> <p>Collection of information on POPs production, use, release, disposal and stockpiles is insufficient.</p> <p>Management departments are not clear of relevant information on enterprises with POPs releases.</p> <p>Related industries, enterprises and the public have an inadequate understanding of POPs.</p>	<p>Establish and improve an information mechanism on Convention implementation management.</p> <p>Include information management relating to POPs into existing information management systems.</p> <p>Collect, sort and summarize relevant domestic basic information, and track the implementation of Convention implementation activities and the development and implementation of relevant policies, programmes and strategies.</p> <p>Giving consideration to the implementation of the declaration and registration</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
	<p>information.</p> <p>For the purpose of this Convention, information on health and safety of humans and the environment shall not be regarded as confidential.</p>				<p>system on POPs releases, submit to the Secretariat of the Convention the information required by the Convention to be declared and reported with regard to the production, use, release, etc., of POPs, and maintain smooth exchange of information with other Parties.</p> <p>Give publicity to POPs knowledge, progress in Convention implementation and policies via the established website <i>China's POPs Actions for Convention Implementation</i> (www.china-pops.org), and release relevant information on Convention implementation as one of the major institutions that make disclosure of national information on POPs.</p> <p>Encourage industrial departments to use network resources to disseminate and release relevant information.</p> <p>Regularly organize the forum on implementation of the Convention to facilitate</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
					exchange and communication between the government, related enterprises and the public and to disseminate experience in Convention implementation
					Compile and publish scientific research findings and summaries of practices and experiences relating to the implementation of the Convention, as well as relevant materials and information
10. Public information, awareness and education	<p>Public information, awareness and education</p> <p>Promote and facilitate awareness regarding POPs among policy and decision makers .</p> <p>Establish mechanisms for the collection and dissemination of information on Convention implementation management regarding POPs release, disposal, etc.</p>	<p>Center for Environmental Education and Communications of State Environmental Protection Administration are responsible for the work on education and public awareness.</p> <p>Related colleges, universities and scientific research institutes have done a lot in public awareness with their own information networks.</p>		<p>POPs educational and public awareness institutions as well as capacity building shall be strengthened.</p> <p>Modes and ways for education and public awareness shall be defined.</p>	<p>Develop training strategies.</p> <p>Incorporate in existing environmental education and communication systems.</p> <p>Develop educational, public awareness and training materials.</p> <p>Strengthen capacity building aimed at decision-making levels, administrative departments, special groups and the public, respectively.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
	<p>Provide to the public all available information on POPs.</p> <p>Develop and implement public awareness programmes, and prepare educational and public awareness materials.</p> <p>Develop training programs and carry out training of workers, scientists, educators and technical and managerial personnel.</p>				Carry out reward activities and commend examples in Convention implementation activities.
13. Financial resources and mechanisms, and technical assistance	<p>Financial resources and mechanisms</p> <p>Provide financial support and incentives regarding national activities relating to the Implementation of the Convention in accordance with the national implementation plan.</p> <p>The developed country Parties shall provide new and additional financial resources to the developing</p>	<p>The Global Environment Facility has provided financial support for China's demonstration activities for Convention implementation.</p> <p>Other multilateral agencies and bilateral governments have provided financial and technical assistance for China's Convention implementation activities.</p> <p>The Chinese Government</p>		<p>Financial investment mechanisms for prevention and control of POPs pollution have not been established.</p> <p>Investment entities for remediation of contaminated sites and soils are not defined.</p> <p>Unintentionally produced POPs involve a number of industries, requiring high costs for release reduction.</p>	<p>Research and develop financial policies for China's implementation of the Convention.</p> <p>Strive for multilateral and bilateral financial assistance for the implementation of the Convention.</p> <p>Determine priorities requiring technical assistance and technology transfer in China.</p> <p>Propose to the relevant</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
	<p>country Parties and Parties with economies in transition for their implementation of the Convention.</p> <p>The extent to which the developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention relating to financial and technical assistance.</p>	<p>has also invested substantial financial resources.</p>		<p>Most producers of termite control products in China operate on a small scale and are unable to engage in research and development of alternatives.</p> <p>There is no feasible technical assistance and technology transfer mechanism in China at present.</p>	<p>conference of the Convention the needs for technical assistance and technology transfer.</p> <p>Promote bilateral and multilateral technical assistance and technology transfer through South-South Cooperation and South-North Corporation.</p> <p>Organize and promote relevant technology transfer activities.</p> <p>Update on a timely basis the priorities of China requiring technical assistance and technology transfer.</p>
15. Reporting	<p>Reporting</p> <p>Report to the Conference of the Parties on the measures taken to implement the provisions of this Convention and on the effectiveness of such measures in meeting the objectives of the Convention.</p>				<p>Under the present framework system for Convention implementation, define the functions and duties of each department concerned in order to meet the needs of data reporting and performance assessment.</p>

Article under the Convention	Obligation	Policy status	Policy execution	Analysis of requirements	Action
	<p>Report to the Conference of the Parties on statistical data on or estimates of the total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B, as well as a list of states from which it has imported each such substance or/and the States to which it has exported each such substance.</p>				

Acronyms and Chemical Symbols

BAT	Best Available Techniques
BEP	Best Environmental Practices
CIO	Convention Implementation Office
COP	Conference of the Parties
DDT	Dichlorodiphenyl trichlorethane
FAO	Food and Agriculture Organization
GAC	General Administration of Customs
GDP	Gross Domestic Product
GEF	Global Environment Facility
HCB	Hexachlorobenzene
mg	milligram = 10^{-3} g
MoST	Ministry of Science and Technology
NDRC	National Development and Reform Commission
ng	nanogram = 10^{-9} g
NCG	National Coordination Group for Implementation of the Stockholm Convention
NIP	National Implementation Plan
NPC	National People's Congress
PCBs	Polychlorinated biphenyls
PCDD/Fs	Polychlorinated dibenzo-p-dioxins and dibenzofurans
pg	picogram = 10^{-12} g
PIC	Prior Informed Consent (Rotterdam Convention)
POPs	Persistent Organic Pollutants
SEPA	State Environmental Protection Administration
SERC	State Electricity Regulatory Commission
TEQ	Toxic Equivalents
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research

References

- [1] Meng Qingyu, Bi Xinhui and Chu Shaogang et al. 2000. An Initial Study on Characterization and Distribution of PCBs in Atmosphere of Contaminated Zone. *Environmental Chemistry*, 19 (6): 501-506.
- [2] Li Chunlei, Mai Bixian and Hao Yongmei et al. 2004. An Initial Study on Pollution Caused by PCBs in Atmosphere of Shenzhen City. *Research of Environmental Sciences*. 17 (5): 6-9.
- [3] Zhang Zulin, Hong Huasheng and Ha Lide et al. 2000. A Study of Elemental Chlorine and PCBs in Surface Water of Xiamen Port. *Marine Environmental Science*. 19 (3): 48-51.
- [4] Zhang Zulin, Chen Weiqi and Ha Lide et al. 2000. A Study on PCBs in Estuary Water Body of the Jiulong River. *Yunnan Environmental Science*. 19 (supplement): 124-129.
- [5] Zhang Zulin, Hong Huasheng and Yu Gang. 2002. A Study on Persistent Organic Pollutants in Estuary of the Minjiang River: PCBs. *Journal of Environmental Sciences*. 22 (6): 788-791.
- [6] Nie Xiangping, Lan Chongyu and Luan Tiangang et al. 2002. SPME Measurement of PCBs in Estuary Water Body of the Pearl River. *Marine Environmental Science*. 21 (2): 65-68.
- [7] Qiu Yaowen, Zhou Junliang, K. Maskaoui et al. 2002. A Study on PCBs and Organic Chlorine in Sea Area of Daya Bay. *Marine Environmental Science*. 21 (1): 46-51.
- [8] Yang Yongliang, Pan Jing, Li Hongli et al. 2003. PCBs in Sediments of Offshore of Yantai and Rizhao and in the Nansi Lake. *Bulletin of Mineralogy, Petrology and Geochemistry*. 22 (2): 108-113.
- [9] Zhu Xinru, Wang Yizhong, Wang Dali et al. 1995. A Study on PCBs Pollution in Baiyangdian Area. *Journal of Environmental Sciences*. 15 (1): 86-91.
- [10] Fang Zhanqiang, Zhang Runxing and Huang Minghong. 2001. Content and Distribution of Organic Chlorine Pesticides and PCBs Contained in *Perna viridis* Living in the Estuary Area of the Pearl River. *Journal of Environmental Science*. 21 (1): 113-116.
- [11] Cheng Xu, Sheng Guoying, Shao Bo et al. 2000. Characteristics and Sources of Organic Chlorine Pesticides Contained in Aerosol and Restaurant Smoke Gas. *China Environmental Science*. 20 (1): 18-22.
- [12] Liu Yanan, Lang Chang, Wu Shuiping et al. 2004. Contents of HCHs and DDT Contained in Particles of Indoor Air. *Environmental Chemistry*. 23 (5): 562-267.
- [13] Zhang Xiufang, Quan Xie et al. 2000. An Investigation into Residues of Polychlorinated Organic Compounds Contained in Water Bodies of the Lower Reaches of the Liao River. *China Environmental Science*. 20 (1): 31-35.
- [14] Zhang ZL, Hong HS, Determination and load of organophosphorus and organochlorine pesticides at water from Jiulong River Estuary, China. *Marine Pollution Bulletin*, 2002, 245 (1-12): 397~402
- [15] Kang Yuehui, Liu Peibin et al. 2003. Pollution Caused by Persistent Organic Chlorine Pesticides in Water Bodies of Shao 1-7K Ding River of Beijing Guanting Reservoir. *Journal of Lake Sciences*. 15 (2): 125-132.
- [16] Zhou Xia, Yu Gang et al. 2005. The Present Situation on Pollution of Chlorobenzene Organic Compounds Contained in Water and Surface Sediments of Beijing's Tonghui River. *Environmental Science*. 26 (2): 117-120.
- [17] Liu Wenxin, Chen Jianglin, Lin Xiumei et al. 2005. Spatial Distribution Characteristics of DDT, PCBs and Phthalic Esters Contained in the Surface Layer of Sediments of the Bohai Sea. *Journal of Environmental Sciences*. 25 (1): 58-63.

- [18] Kang Yuehui, Liu Peibin et al. 2003. Pollution of Persistent Organic Chlorine Pesticides in Water Bodies of the Yongding River Water System of Beijing Guanting Reservoir. *Journal of Lake Sciences*. 15 (2): 125-132.
- [19] Yuan Xuyin, Wang Yu et al. 2003. Characteristics of and Risk Assessment on Residues of Organic Chlorine Pesticides Contained in sediments of the Taihu Lake. *Environmental Science*. 24 (1): 121-125.
- [20] Yang Yi, Liu Min et al. 2003. Distribution of PCBs and OCPs in the Surface Sediments of Tidal Flat of Estuary of the Yangtze River. *China Environmental Sciences*. 23 (2): 215-219.
- [21] Hu Xiongxing, Xia Dexiang, Han Zhonghao and Wang Wenhua. 2005. Distribution and Fatal of Organic Chlorine Pesticides Contained in Water and Sediments of the Suzhou River. *China Environmental Sciences*. 25 (1): 124-128.
- [22] Zhang Zulin, Hong Huasheng et al. 2003. Contents of Organic Chlorine Pesticides in Estuary Water, Interstitial Water and Sediments of the Minjiang River. *Environmental Science*. 24 (1): 117-120.
- [23] Qiu Yaowen, Zhou Junliang et al. 2002. A Study on PCBs and Organic Chlorine Pesticides Contained in Sea Area of Daya Bay. *Marine Environmental Sciences*. 21 (1): 46-51.
- [24] Wang Maoqi, Wang Zhutian, Bao Dayao et al. Monitoring and Analysis of Food Pollution in China 2000. *Chinese Journal of Food Hygiene*. Issue 02, 2002.
- [25] Schecter A, Jiang K, Papke O, Furst P, Furst C, Comparison of dibenzodioxin levels in blood and milk in agricultural workers and others following pentachlorophenol exposure in China, *Chemosphere*. 1994 Nov-Dec; 29 (9-11):2371-80.
- [26] Jin Yihe, Chen Huichi, Tang Chujun et al. 2003. An Investigation of Pollution Levels of Dioxin in 79 Cases of Breast Milk in Dalian and Shenyang. *Chinese Journal of Preventive Medicine*. 37 (6)

The People's Republic of China

National Implementation Plan for the Stockholm
Convention on Persistent Organic Pollutants

Part II

(Implementation Plan of Hong Kong Special Administrative Region
for the Stockholm Convention on Persistent Organic Pollutants)

**Hong Kong Special Administrative Region
Implementation Plan for the Stockholm Convention
on Persistent Organic Pollutants (POPs)**

September, 2006



Environmental Protection Department
The Government of the Hong Kong
Special Administrative Region

Table of Contents

List of Tables	4
List of Figures	5
List of Annexes	6
Abbreviations and Acronyms	7
Executive Summary	9
1. INTRODUCTION	11
2. THE HKSAR BASELINE	11
2.1 The HKSAR Basic Profile	11
2.2 Environmental Policies and Legislative Framework for POPs Control and Management	12
2.2.1 Legislative Framework on POPs Control	12
2.2.1.1 Pesticides	12
2.2.1.2 Hazardous Chemicals	12
2.2.1.2.1 Air Pollution Control Ordinance (APCO)	13
2.2.1.2.2 Water Pollution Control Ordinance (WPCO)	13
2.2.1.2.3 Waste Disposal Ordinance (WDO)	14
2.2.1.2.4 Environmental Impact Assessment Ordinance (EIAO)	14
2.2.2 Roles and Responsibilities of Relevant Government Bureaux/Departments	14
2.2.3 Obligations under Other Related Environmental Conventions Applicable and Proposed to be Applicable to the HKSAR	17
2.2.3.1 The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	17
2.2.3.2 The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	17
2.3 Overview of the Current POPs Issue in the HKSAR	18
2.3.1 Source Inventories of POPs	18
2.3.1.1 Trade, Production and Use of Intentional POPs	18
2.3.1.1.1 Pesticides	18
2.3.1.1.2 Industrial Chemicals	19
2.3.1.2 Release of Unintentional POPs as by-Products	20
2.3.1.2.1 Dioxins and Furans	20
2.3.1.2.2 Hexachlorobenzene	26
2.3.1.2.3 Polychlorinated Biphenyls	27
2.3.1.3 Contaminated Sites	27

2.3.2	Environmental Levels of POPs.....	27
2.3.2.1	Contamination Levels of POPs in Environmental Media.....	27
2.3.2.1.1	Ambient Air	28
2.3.2.1.2	Surface Water.....	29
2.3.2.1.3	Surface Sediment	29
2.3.2.1.4	Surface Soil.....	29
2.3.2.1.5	Vegetation	30
2.3.2.2	Contamination Levels of POPs in Aquatic Biota.....	30
2.3.2.2.1	Freshwater Fish.....	31
2.3.2.2.2	Marine Fish and Shellfish	31
2.3.2.2.3	Water Bird Eggs.....	31
2.3.2.2.4	Marine Mammals.....	31
2.3.3	Dietary Exposure to POPs	32
2.3.4	Human Body Burden of POPs	34
2.3.4.1	Human Breast Milk.....	34
2.4	Analysis of POPs Inventory Data Gaps.....	35
2.4.1	Source Inventories on POPs	35
2.4.1.1	Trade, Production and Use of Intentional POPs	35
2.4.1.2	Release of Unintentional POPs as by-Products	35
2.4.1.3	Contaminated Sites	36
2.4.2	Environmental Levels of POPs.....	36
2.4.2.1	Contamination Levels of POPs in Environmental Media.....	36
2.4.2.2	Contamination Levels of POPs in Aquatic Biota.....	36
2.4.3	Dietary Exposure to POPs	36
2.4.4	Human Body Burden of POPs	37
2.5	Environmental and Human Health Risk Assessment of POPs	37
2.5.1	Comparison with Other Countries/Regions.....	37
2.5.1.1	Annual Release of Dioxins/Furans	37
2.5.1.2	Contamination Levels of POPs in Environmental Media and Marine Biota.....	37
2.5.1.2.1	Ambient Air	37
2.5.1.2.2	Marine Water and Sediment.....	37
2.5.1.2.3	Marine Fish and Shellfish.....	38
2.5.1.2.4	Contamination Levels of POPs in Human Breast Milk.....	38
2.5.2	Ecological Risk Assessment	38
2.5.2.1	Risk Assessment of POPs to Pelagic Organisms	39
2.5.2.2	Risk Assessment of POPs to Benthic Organisms	39
2.5.3	Health Risk Assessment.....	39
2.5.3.1	Estimate of Daily Total Exposure to Dioxins/Furans	40
2.5.3.2	Human Non-Carcinogenic Risk Assessment on POPs	40
2.5.3.3	Human Carcinogenic Risk Assessment on POPs	40
2.5.3.3.1	Inhalation Carcinogenic Risk Assessment.....	40
2.5.3.3.2	Dietary Carcinogenic Risk Assessment	41
2.5.3.4	Levels of POPs Contamination in Local Marine Biota	41

2.5.3.5 Human Incremental Risk Assessment on POPs in Local Marine Environment.....	41
2.5.3.5.1 Incremental Non-Carcinogenic Risk Assessment.....	41
2.5.3.5.2 Incremental Carcinogenic Risk Assessment.....	41
3. STRATEGIES, PRIORITIES AND ACTION PLANS OF THE HKSAR IMPLEMENTATION PLAN	42
3.1 POPs Management Framework and Implementation Strategy.....	42
3.2 Overall Assessment of Current POPs Pollution in Hong Kong.....	42
3.3 Action Plans.....	43
3.3.1 Strengthening of the Institutional and Regulatory Systems.....	43
3.3.2 Validation and Refinement of the POPs Inventories.....	43
3.3.3 Measures to Reduce Emission of Unintentionally Produced POPs.....	45
3.3.4 Public Awareness Campaign.....	47
3.3.5 Regional Collaboration with the Mainland.....	47
3.3.6 Capacity Building	48
3.3.7 Implementation Plan Review and Effectiveness Evaluation	49

List of Tables

		Page
Table 1	Roles and Responsibilities of Relevant Bureaux/Departments in the HKSAR Government in Environmental and Human Health Protection	15
Table 2	Source Characterization and Quantification of POPs Pesticides in Hong Kong for the Period 2000 – 2004	18
Table 3	Domestic Use of PCBs and PCB Waste Disposal in Hong Kong for the Period 1994 -2004	19
Table 4	Summary of Annual Dioxin/Furan (PCDD/F) Emission Inventory in Hong Kong for the Year 2003 – A Breakdown on Subcategories and Individual Classes of Activity	21
Table 5	Mean Levels of POPs Contamination in the Environment of Hong Kong for the Period 2002 – 2004	28
Table 6	Mean Levels of POPs Contamination in Aquatic Biota of Hong Kong for the Period 2002 – 2004	30
Table 7	Estimates of Dietary Exposure to POPs Contamination in Foods of Hong Kong for the Year 2003	33
Table 8	Mean Levels of POPs Contamination in Breast Milk of Hong Kong Mothers for the Period 2000 - 2002	34
Action Plan 1	Legislative Framework for POPs Management and Control	43
Action Plan 2	Validation and Refinement of the POPs Inventories	44
Action Plan 3	Measures to Reduce Emission of Unintentionally Produced POPs	46
Action Plan 4	Public Awareness Campaign	47
Action Plan 5	Regional Collaboration with the Mainland	48
Action Plan 6	Capacity Building	48

List of Figures

		Page
Figure 1	Contribution of Various Emission Source Categories to Annual Dioxin/Furan Emission	22
Figure 2	Percentage of Dioxin/Furan Emission on a Vector Basis	23
Figure 3	Contribution of Different Source Categories to Annual Dioxin/Furan Emission to Air	24
Figure 4	Contribution of Different Source Categories to Annual Dioxin/Furan Emission to Residues	26

List of Annexes

- Annex 1 Development of the HKSAR Implementation Plan
- Annex 2 Development of the HKSAR POPs Inventory
- Annex 3 Survey on Import, Export, Domestic Production and Use of Non-pesticide
Industrial Chemicals in the HKSAR
- Annex 4 Pesticides Management and Control in the HKSAR
- Annex 5 Stakeholder Consultation Documents

Abbreviations and Acronyms

ADI	Acceptable Daily Intake
AFCD	Agriculture, Fisheries and Conservation Department
APCO	Air Pollution Control Ordinance
APCS	Air pollution control system
BAT	Best available techniques
BEP	Best environmental practices
BPM	Best practicable means
bw	Body weight
CED	Customs and Excise Department
CEDD	Civil Engineering and Development Department
CPG	Central People's Government
CSD	Census and Statistics Department
CWTC	Chemical Waste Treatment Centre
DDT	1,1,1-trichloro-2,2-bis (4-chlorophenyl) ethane
DGO	Dangerous Goods Ordinance
DH	Department of Health
DL	Detection limit
DSD	Drainage Services Department
dw	Dry weight
EC	European Community
EF	Emission factor
EIAO	Environmental Impact Assessment Ordinance
EPD	Environmental Protection Department
FEHD	Food and Environmental Hygiene Department
FSD	Fire Services Department
GEF	Global Environment Facility
GEMS	Global Environment Monitoring System
GL	Government Laboratory
HCB	Hexachlorobenzene
HKSAR	Hong Kong Special Administrative Region
HKSARG	The Government of the Hong Kong Special Administrative Region
HKSARIP	Hong Kong Special Administrative Region Implementation Plan
HQ	Hazard Quotient
IEO	Import and Export Ordinance
IRIS	Integrated Risk Information System
I-TEQ	International toxic equivalents developed by the NATO Committee on the Challenges of Modern Society (CCMS) in 1998
IWMF	Integrated Waste Management Facilities
LADD	Lifetime Average Daily Dose
ng	Nanogram
NIP	National Implementation Plan

NO _x	Nitrogen oxide
NPC	National People's Congress
OC	Organochlorine
OCP	Organochlorine pesticides
PCB	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzo- <i>para</i> -dioxins
PCDF	Polychlorinated dibenzofurans
PCNB	Quintozene
PCP	Pentachlorophenol
pg	Picogram
PO	Pesticides Ordinance
POPs	Persistent organic pollutants
PRA	Probabilistic Risk Assessment
PRC	People's Republic of China
PRD	Pearl River Delta
QA/QC	Quality Assurance/Quality Control
RfD	Reference Dose
RSP	Respirable Suspended Particulate
SEPA	State Environmental Protection Administration
TCTP	Chlorthal-dimethyl
TDI	Tolerable daily intake
TEQ	Toxicity equivalents
TID	Trade and Industry Department
UNEP	United Nations Environment Programme
USEPA	United States Environmental Protection Agency
WDO	Waste Disposal Ordinance
WHO	World Health Organization
WPCO	Water Pollution Control Ordinance
WSD	Water Supplies Department
ww	Wet weight

Executive Summary

The Stockholm Convention is a global treaty to protect human health and the environment from the potentially harmful effects of persistent organic pollutants (POPs). In implementing the Convention, Parties will need to take measures to control/restrict the trade, domestic production and use of ten intentionally produced POPs (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene (HCB), mirex, toxaphene and polychlorinated biphenyls (PCBs)), and to reduce and where possible to ultimately eliminate the production and release of two unintentionally produced POPs by-products (polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs)).

The Stockholm Convention became effective to the People's Republic of China (PRC), including the Hong Kong Special Administrative Region (HKSAR), on November 11, 2004. In accordance with the Convention requirements, the PRC will submit a National Implementation Plan (NIP), which includes the HKSAR Implementation Plan (HKSARIP), to the Conference of the Parties of the Stockholm Convention before November 11, 2006.

In preparing the HKSARIP, we reviewed the existing legislative framework for POPs control and management in Hong Kong. The POPs pesticides are controlled under the Pesticides Ordinance and the Import and Export Ordinance. A number of environmental ordinances are also in place to impose "downstream" control of air and water pollution and waste disposal. However, there is no legislation enacted specifically for regulating the "upstream" activities (import, export, manufacture and use) of non-pesticide hazardous chemicals, including POPs.

After the legislative review, an inventory on the current status of POPs in Hong Kong was compiled. This inventory provided a scientific basis for assessing the environmental and human health impacts of POPs and was fundamental to the prioritization of the proposed action items in the HKSARIP to reduce or eliminate POPs.

The POPs inventory framework was developed in accordance with relevant UNEP guidance documents. Existing data on emission sources, environmental contamination levels, dietary exposure and human body burden of the 12 Convention POPs in Hong Kong from all available sources (relevant government databases, local academia and open literature) were collated and assembled. Data screening and quality assurance checks were conducted at initial information retrieval and all data entries were cross-checked during data compilation.

All nine Convention POPs pesticides (i.e., aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, HCB, mirex and toxaphene) were either never registered or had been banned from all uses and purposes in the HKSAR for many years. The 2004 inventory indicated only a very small quantity of PCBs in PCB-containing equipment in use/ stockpile compared with those reported for other industrialized areas around the world.

Dioxins (PCDDs) and furans (PCDFs) are unintentional by-products of industrial and combustion processes. In 2003, there was an annual emission of 20.3 g TEQ dioxins/furans to

the local environment via all vectors (air, water, land, product and residues). The major route of release was “residues”, responsible for 82.4% of the total, followed by “air” (12.9%) and “water” (4.2%). On a “per capita” basis, the 2003 annual dioxin/furan release in Hong Kong was generally similar to those of Asian regions, Canada, the US and Australia, and was the 2nd lowest in air emission.

The level of POPs contamination in the local environment (ambient air, marine water, marine sediment, marine fish and shellfish) was generally comparable to the range reported in most other urban locations in Asia Pacific, Europe, the US and Australia. Assessment based on available data indicated that overall, there was unlikely to be any unacceptable ecological risk of toxicological significance associated with exposure of the local marine life to the current level of POPs contamination in the marine environment of Hong Kong.

Total daily exposure of local residents to dioxins/furans was estimated to be 0.927 pg TEQ/kg bw/day, a value falling at the lower end of the Tolerable Daily Intake of 1-4 pg TEQ/kg bw/day set by the World Health Organisation (WHO). Dietary intake was the major route, accounting for 98.2% of total exposure of local residents to dioxins/furans. Results of human health risk assessment indicated that there was no unacceptable inhalation nor dietary chronic/carcinogenic risk of toxicological concern associated with a lifetime exposure of local residents to the current levels of POPs contamination in the local environment and locally consumed foods. Levels of POPs in the local marine biota were found to be well below national/overseas Food Safety Standards/Action Levels of the Mainland, the US and the EC.

Gap analysis of the HKSAR’s current legislative framework and POPs inventories, was performed to identify areas that needed to be strengthened to ensure full compliance with the Stockholm Convention requirements. Strategies and action plans were developed to reflect local priorities. The key issues to be pursued are:

- Strengthening the institutional and regulatory systems – to consider a review of the overall pesticide control system and to enact new legislation to regulate the import, export, manufacture and use of non-pesticide hazardous chemicals in Hong Kong;
- Characterizing local dioxin/furan emission sources – to validate annual production activities and estimate emission levels;
- Introducing systematic monitoring of all 12 POPs in the environmental media, locally consumed foods and human breast milk;
- Introducing measures to reduce emission of unintentional POPs to the local environment;
- Raising public awareness;
- Enhancing regional collaboration with the Mainland – to harmonize POPs monitoring and analytical protocols, and to facilitate information exchange and knowledge sharing; and
- Capacity building – to promote best available techniques (BAT) / best environmental practices (BEP), and to enhance local POPs analytical capabilities.

It is envisaged that the HKSARIP will generate useful data for updating and refining the POPs inventories which are instrumental to a science-based re-assessment of the local POPs situation and evaluation of the effectiveness of the HKSARIP in reducing dioxin/furan emissions.

1. INTRODUCTION

Persistent organic pollutants (POPs) are organochlorine compounds that persist in the environment, bio-accumulate and bio-magnify through the food chain. Their movement within environmental compartments and long-range transport often result in serious threat to the environment and human population around, and also distant from their original point of release. The United Nations Environment Programme (UNEP) has identified an initial set of 12 POPs to be targeted for global restriction of production/use and, where possible, ultimate elimination under the Stockholm Convention (the Convention). The 12 POPs include pesticides (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene (HCB), mirex and toxaphene), industrial chemicals (HCB and polychlorinated biphenyls (PCBs)), and unintentionally produced by-products, i.e., dioxins (polychlorinated dibenzo-*p*-dioxins (PCDDs)) and furans (polychlorinated dibenzofurans (PCDFs)).

The Convention was adopted in Stockholm on May 22, 2001 and entered into force on May 17, 2004. The Convention became effective to the People's Republic of China (PRC), including the Hong Kong Special Administrative Region (HKSAR), on November 11, 2004. According to the work plan, the HKSAR is to develop a HKSAR Implementation Plan (HKSARIP) which will form part of the PRC's National Implementation Plan (NIP) to be submitted to the Conference of the Parties of the Stockholm Convention before November 11, 2006.

The POPs Unit of the Environmental Protection Department (EPD) of the Government of the HKSAR (HKSARG) is responsible for preparing the HKSARIP, working on new legislation to regulate non-pesticide hazardous chemicals, and coordinating matters relating to the implementation of the Convention in the HKSAR. Preparation of the HKSARIP and an inventory of POPs in Hong Kong are described in Annexes 1 and 2, respectively. Stakeholder consultation is an important process in the preparation of the HKSARIP. Details of a stakeholder consultation workshop convened to seek views from relevant stakeholders on POPs-related issues in Hong Kong are presented in Annex 5.

2. THE HKSAR BASELINE

2.1 The HKSAR Basic Profile

The HKSAR is situated in the Pearl River Delta (PRD) at the south-eastern tip of Mainland China. It has a total area of 1,104 km², comprising Hong Kong Island, the Kowloon Peninsula, the New Territories and 262 outlying islands. Hong Kong's climate is sub-tropical.

Hong Kong has one of the finest deep-water ports in the world and is a well established international financial, trading and business hub. It is widely recognized as the world's freest economy (Heritage Foundation's 2005 Index of Economic Freedom) and one of the most competitive economies in the world (ranked 2nd by International Institute for Management Development in its World Competitiveness Yearbook 2005). Over the past few decades, there has

been a structural transformation of the Hong Kong economy from manufacturing to service orientation. The local industrial activities have shrunk to a substantial extent in both variety and size as manufacturing enterprises have progressively relocated their production lines to the Mainland. On the other hand, trading and logistics, finance and banking, tourism, and a wide range of business services are becoming more important.

With a population of 6.9 million, Hong Kong is one of the world's most densely populated cities (6,380 persons per km² according to the 2004 data of the Census and Statistics Department). Over the years, Hong Kong has developed an efficient wholesale and retail network to cater for the growing consumption needs of a more affluent population.

The dense population coupled with a high level of dynamic economic activities has exerted intense pressure on Hong Kong's environment. This is further compounded by the effects of immense economic growth in the PRD, one of the fastest developing regions in the world. Since the 1980s, the HKSARG has been implementing various plans and programmes to meet the local environmental challenges. Pollution by toxic substances including POPs is a relatively new area of focus in Hong Kong, but one that has received increased attention in recent years. Programmes for monitoring air and water toxic pollutants have been established to assess background pollution and to better safeguard the environment and human health.

2.2 Environmental Policies and Legislative Framework for POPs Control and Management

2.2.1 Legislative Framework on POPs Control

In implementing the Stockholm Convention, Parties will take measures to control/restrict the import, export, domestic production and use of intentionally produced POPs (pesticides and industrial chemicals), to reduce and where possible to ultimately eliminate the production and release of unintentional POPs (dioxins/furans) from anthropogenic sources to the environment, and to impose proper handling and disposal of POPs-containing wastes.

2.2.1.1 Pesticides

The pesticides are controlled under the Pesticides Ordinance (Cap 133) administered by the Agriculture, Fisheries and Conservation Department (AFCD) under the Health, Welfare and Food Bureau (HWFB). The import, manufacture, supply and retail of pesticides in Hong Kong are regulated by a licensing/permit system. In addition, all pesticides entering/leaving Hong Kong are required to be covered by an import/export licence issued under the Import and Export Ordinance (Cap 60) which, however, does not apply to pesticides that are in air transshipment cargoes and pesticides in transit.

2.2.1.2 Hazardous Chemicals

Control of hazardous chemicals is within the ambit of environmental policies administered by the Environmental Protection Department (EPD) under the Environment, Transport and Works

Bureau (ETWB). Legislation and licensing are the major regulatory instruments. A number of environmental ordinances are now in place to deal with the control of air and water pollution and waste handling and disposal. They cover a wide range of chemicals which include hazardous chemicals. However, there is no legislation enacted specifically for regulating the import, export, manufacture and use of hazardous chemicals in Hong Kong. Relevant key environmental legislation includes:

- Air Pollution Control Ordinance (Cap 311)
- Water Pollution Control Ordinance (Cap 358)
- Waste Disposal Ordinance (Cap 354) and Waste Disposal (Chemical Waste) (General) Regulation (Cap 354C)
- Environmental Impact Assessment Ordinance (Cap 499)

2.2.1.2.1 Air Pollution Control Ordinance (APCO)

The APCO (Cap 311) enacted in 1983 is the principal law for managing air quality. The Ordinance provides control over aerial emission of various toxic air pollutants from stationary and mobile sources and enables the promulgation of regulations to establish administrative procedures and work practices for effecting the reduction of pollution to the atmosphere.

Various regulatory schemes which directly or indirectly contribute to the reduction in emission of unintentionally produced POPs to the atmosphere are in place to control pollution from combustion sources. These include:

- Air Pollution Control (Specified Processes) Regulations (Cap 311F)
- Air Pollution Control (Furnaces, Oven and Chimneys) (Installation and Alteration) Regulations (Cap 311A)
- Air Pollution Control (Smoke) Regulations (Cap 311C)
- Air Pollution Control (Open Burning) Regulation (Cap 311O)
- Air Pollution Control (Motor Vehicle Fuel) Regulation (Cap 311L)
- Air Pollution Control (Vehicle Design Standards) (Emission) Regulations (Cap 311J)
- Air Pollution Control (Emission Reduction Devices for Vehicles) Regulation (Cap 311U)

2.2.1.2.2 Water Pollution Control Ordinance (WPCO)

The WPCO (Cap 358) enacted in 1980 is the principal law for managing water quality. The Ordinance provides for the establishment of Water Quality Objectives (WQOs) in relation to the beneficial uses of water bodies and defines Water Control Zones (WCZs) for the entirety of Hong Kong waters within which discharges of effluent are subject to licensing control.

The WQOs set for all WCZs specify that toxic substances in the water should not attain such levels as to produce significant toxic, mutagenic, carcinogenic or teratogenic effects in humans, fish or any other aquatic organisms, with due regard to biologically cumulative effects in food chains and to interactions of toxic substances with each other.

The standards for effluent discharged into the various WCZs are specified in the *Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters* (TM). The TM prohibits the discharge of toxic substances (including fumigants, pesticides, polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), chlorinated hydrocarbons, flammable or toxic solvents, petroleum oil or tar and calcium carbide) to foul sewers, inland and coastal waters. It also specifies numerical discharge limits for total suspended solids, Biochemical Oxygen Demand (BOD), oil and grease, toxic metals and chemical compounds such as cyanide, phenol, sulphide, total residual chlorine and surfactants.

2.2.1.2.3 Waste Disposal Ordinance (WDO)

The WDO (Cap 354) enacted in 1980 is the principal law for environmentally sound management of waste collection and disposal. The Ordinance provides control over the handling and disposal of livestock waste and chemical waste, the import and export of wastes (including implementation of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal) and the licensing of waste collection services and waste disposal facilities. Its subsidiary legislation, the *Waste Disposal (Chemical Waste) (General) Regulation (Cap 354C)*, provides for the control, through licensing requirements, of packaging, labeling, storage, collection and disposal (including treatment, reprocessing and recycling) of chemical waste, and the registration of chemical waste producers. Chemical waste is defined under the regulation in a schedule of specific substances and chemicals based on their potential risk to human health and/or pollution to the environment. Disposal of chemical wastes containing PCBs and unintentionally produced POPs is controlled under the WDO.

2.2.1.2.4 Environmental Impact Assessment Ordinance (EIAO)

The EIAO (Cap 499) enacted in 1997 provides a legal instrument for assessing potential environmental impacts of designated projects at the planning stage and for the protection of the environment. The Ordinance contains provisions to avoid, minimize and control adverse impacts to the local environment of designated projects through an environmental permit and environmental monitoring and audit system. The Technical Memorandum for Environmental Impact Assessment Ordinance (EIAO-TM) sets out the technical requirements for the EIA process and the criteria for determining the environmental acceptability of designated projects, stipulating that any adverse environmental effects should be avoided to the maximum practicable extent and minimized to within acceptable levels.

2.2.2 Roles and Responsibilities of Relevant Government Bureaux/Departments

Table 1 summarizes the roles and responsibilities of Government bureaux/departments in protecting the environment and human health against the potential harmful effects of hazardous chemicals including POPs.

Table 1 Roles and Responsibilities of Relevant Bureaux/Departments in the HKSARG in Environmental and Human Health Protection

Bureaux/Departments	Relevant Roles and Responsibilities	Legislative Instruments
<i>Economic Development and Labour Bureau</i>		
Labour Department	<ul style="list-style-type: none"> Control the manufacture, process or work involving certain specified hazardous chemicals (such as carcinogenic substances) to protect workers' safety 	<ul style="list-style-type: none"> Factories and Industrial Undertakings Ordinance (Cap 59) Occupational Safety and Health Ordinance (Cap 509)
Marine Department	<ul style="list-style-type: none"> Prevent, mitigate and repair pollution of and damage to the waters of Hong Kong arising from oil spillage, and from contamination of the sea by hazardous substances discharged from ships 	<ul style="list-style-type: none"> Merchant Shipping (Prevention and Control of Pollution) Ordinance (Cap 413) Merchant Shipping (Safety) Ordinance (Cap 369)
<i>Environment, Transport and Works Bureau</i>		
Drainage Services Department	<ul style="list-style-type: none"> Provide an effective system for sewage collection, treatment and disposal in an environmentally responsible manner to ensure public safety and health Maintain a database on effluent/sludge production in sewage treatment works 	
Environmental Protection Department	<ul style="list-style-type: none"> Impose "downstream" control on air emission, effluent discharge and waste disposal (including chemical waste) of environmental toxic pollutants Conduct environmental monitoring to assess compliance and provide a basis for the planning of pollution control strategies Set out technical requirements for the environmental impact assessment (EIA) processes at the planning stage, to avoid, minimize and control potential adverse impacts to the local environment of designated projects 	<ul style="list-style-type: none"> Air Pollution Control Ordinance (Cap 311) Water Pollution Control Ordinance (Cap 358) Waste Disposal Ordinance (Cap 354) Dumping at Sea Ordinance (Cap 466) Environmental Impact Assessment Ordinance (Cap 499)
Water Supplies Department	<ul style="list-style-type: none"> Provide quality water services and ensure public health and safety through routine monitoring of toxic chemicals in drinking water 	

Bureaux/Department	Relevant Roles and Responsibilities	Legislative Instruments
<i>Financial Services and Treasury Bureau</i>		
Census and Statistics Department	<ul style="list-style-type: none"> • Maintain a database of vital statistics to facilitate research, planning and decision-making within the Government and in the community 	
<i>Health, Welfare and Food Bureau</i>		
Agriculture, Fisheries and Conservation Department	<ul style="list-style-type: none"> • Control the manufacture, import, supply, storage, and retail sale of pesticides in Hong Kong • Administer the import and export licensing control system of pesticides in Hong Kong 	<ul style="list-style-type: none"> • Pesticides Ordinance (Cap 133) • Import and Export Ordinance (Cap 60)
Department of Health	<ul style="list-style-type: none"> • Execute health care policies and statutory functions and safeguard the health of the community through promotive, preventive, curative and rehabilitative services 	
Food and Environmental Hygiene Department	<ul style="list-style-type: none"> • Ensure food safety through food surveillance and certification, conduct dietary risk assessment and risk communication and advice on food safety standards 	<ul style="list-style-type: none"> • Public Health and Municipal Services Ordinance (Cap 132)
Government Laboratory	<ul style="list-style-type: none"> • Provide laboratory analytical services to Government departments on samples of various matrices to meet client departments' respective responsibilities for environmental protection, public health and safety 	
<i>Security Bureau</i>		
Customs and Excise Department	<ul style="list-style-type: none"> • Control the import and export of commodities and certain prohibited articles by air, land, and sea. 	<ul style="list-style-type: none"> • Import and Export Ordinance (Cap 60)
Fire Services Department	<ul style="list-style-type: none"> • Control the manufacture, labelling, packaging, storage, transport (on land and at sea) and use of dangerous goods (including corrosive, flammable and poisonous substances, etc) 	<ul style="list-style-type: none"> • Dangerous Goods Ordinance (Cap 295)

2.2.3 Obligations under Other Related Environmental Conventions Applicable and Proposed to be Applicable to the HKSAR

2.2.3.1 The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

The Basel Convention aims to protect the environment and human health from the harmful effects of hazardous waste. The Convention defines the global means to: (a) minimize hazardous waste at source; (b) strictly control the transboundary movement of hazardous waste; and (c) ensure that the hazardous wastes are disposed of in an environmentally sound manner. The Convention requires that a prior informed consent system be put in place to control and monitor the transboundary movement of hazardous waste among the Parties to the Convention.

The Convention was adopted by the Conference of Plenipotentiaries in Basel in 1989 and entered into force in May 1992. The PRC Government deposited its instrument of ratification with the Secretary-General of the United Nations on December 17, 1991. The Convention is also applicable to the HKSAR.

The State Environmental Protection Administration (SEPA) is the National Focal Point of the PRC for the Convention and EPD is the designated Competent Authority of the HKSAR for implementing the Convention in Hong Kong. Transboundary movement of hazardous waste as specified in the 7th Schedule to the WDO is subject to import/export control provided for in that Ordinance. EPD has established an information exchange network with both local and overseas control authorities to monitor waste shipment activities and to collect intelligence of dubious waste shipment for joint enforcement action to effectively combat illegal shipment of hazardous waste in the region.

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

The Rotterdam Convention aims to promote shared responsibility and cooperative efforts among the contracting parties in the international trade of certain hazardous chemicals and pesticides in order to protect human health and the environment from potential harm. The Convention has introduced a mandatory prior informed consent procedure (PIC procedure) to monitor and control the import and export of certain hazardous chemicals and disseminate national importing decisions to the contracting parties. The Rotterdam PIC procedure applies to 24 pesticides, 6 severely hazardous pesticide formulations and 11 industrial chemicals.

The Convention was adopted at the Diplomatic Conference held in Rotterdam on September 10, 1998 and entered into force on February 24, 2004. The Convention became applicable to the PRC (not including the HKSAR) on June 20, 2005. After enactment of new legislation to regulate the import, export, manufacture and use of hazardous chemicals covered by the Convention, the HKSARG would request that the CPG make arrangements for applying the Convention to the HKSAR. For implementing the Convention in Hong Kong, AFCD will be responsible for the control of PIC pesticides, while EPD will be responsible for the control of PIC industrial chemicals.

2.3 Overview of the Current POPs Issue in the HKSAR

2.3.1 Source Inventories of POPs

2.3.1.1 Trade, Production and Use of Intentional POPs

2.3.1.1.1 Pesticides

Nine pesticides (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, HCB, mirex and toxaphene) had been identified as intentionally produced POPs by the Convention, targeted for global elimination or restricted production and use. In Hong Kong, these pesticides were either not registered or had their registration status cancelled for many years due to toxicological or environmental concern.

Aldrin	Chlordane	DDT	Dieldrin	Endrin	Heptachlor	HCB	Mirex	Toxaphene
1988*	1991*	1988*	1988*	NR	NR	NR	1997*	1984*

* : The year prohibited from all use and trade activity unless under a pesticide permit granted in exceptional circumstances

NR: Not registered

Table 2 presents the local source characterization and quantification of the nine POPs pesticides. There was no import, export, manufacture nor use and no stockpiling of any of these pesticides in Hong Kong for the past 5 years (2000–2004). Trans-shipment of DDT was reported for the years 2000–2003 but not for 2004, while trans-shipment of mirex was recorded for 2004 only.

Table 2 Source Characterization and Quantification of POPs Pesticides in Hong Kong for the Period 2000 – 2004

Chemical	Import (t/a)	Export (t/a)	Manufacture (t/a)	Use (t/a)	Stockpile (kg)		Transshipment (kg)			
					2000-2004	2000	2001	2002	2003	2004
Aldrin	0	0	0	0	0	0	0	0	0	0
Chlordane	0	0	0	0	0	0	0	0	0	0
DDT	0	0	0	0	0	112,600	274,228	153,118	123,440	0
Dieldrin	0	0	0	0	0	0	0	0	0	0
Endrin	0	0	0	0	0	0	0	0	0	0
Heptachlor	0	0	0	0	0	0	0	0	0	0
HCB	0	0	0	0	0	0	0	0	0	0
Mirex	0	0	0	0	0	0	0	0	0	125
Toxaphene	0	0	0	0	0	0	0	0	0	0

2.3.1.1.2 *Industrial Chemicals*

Stockpiles of PCBs contained in PCB-products manufactured from past industrial activities exist. Results of periodic PCB-equipment surveys conducted by EPD in 1994/95, 2001/02 and 2004 are presented in Table 3. There have been no PCB-containing transformer stockpile in Hong Kong since 2001/02 and the number of PCB-capacitor units dropped significantly from an initial 830 in 1994/95 to 303 in 2001/02. In 2004, the number of PCB-capacitor units further dropped to 191, under 14 registered chemical waste producers. Most of these capacitor units were small ones. Of the 191 capacitor units, only 85 were still in use and 106 were stockpiles being stored in the workplace waiting to be disposed of anytime. The total quantity of PCBs in use/stockpile was estimated to be 422 kg. Phased out PCB-containing equipment is classified as a chemical waste, the disposal of which is under the control of the WDO. Small PCB-containing equipment and PCB-fluid removed from large PCB-containing equipment are incinerated at the Chemical Waste Treatment Centre (CWTC). The PCB-contaminated solid waste is disposed of at landfills. The total quantities of PCB-waste disposed of during 1994-2001 and 2002-2004 are shown below (Table 3).

Table 3 Domestic Use of PCBs and PCB Waste Disposal in Hong Kong for the Period 1994 - 2004

PCB-Containing Equipment	1994/1995	2001/2002	2004
High voltage transformer (no. of units) <ul style="list-style-type: none"> . power plants / power stations . railway / mass transit railway 	13	0	0
High voltage capacitor (no. of units) <ul style="list-style-type: none"> . factories / old buildings 	830	303	191
High voltage capacitor <u>in use</u> (no. of units) <ul style="list-style-type: none"> . Industries . Dockyard . Hospital . Estate management 			85 27 48 3 7
High voltage capacitor <u>stockpile</u> (no. of units)			106
Total PCB in use/stockpile (kg)			422*
PCB-Waste Disposal		1994-2001 (kg)	2002-2004 (kg)
PCB-fluid waste disposed of at CWTC		25,305	2
PCB-containing solid waste disposed of at CWTC		16,379	3,210
PCB-contaminated solid waste disposed of at landfills		48,225	0

* The PCB content of individual capacitor unit was calculated based on its unit volume, assuming a capacitor of size (60 cm × 30 cm × 15 cm) would contain 1.4 kg of 100% PCB fluid

It was noted that PCBs might also be present in minute quantities in some consumer products such as small old electrical appliances/parts, electronics, impact papers, adhesives, sealants, plastic materials and paints. The 2003 Census and Statistics figures showed local trading activities of these consumer products. However, in the absence of information on the product content of PCBs, no estimate of total PCBs in semi-closed and open application could be made. The relative contribution from this category was likely to be insignificant.

No information was available on the domestic use of HCB as an industrial chemical in Hong Kong.

2.3.1.2 Release of Unintentional POPs as by-Products

2.3.1.2.1 Dioxins and Furans

Dioxins (PCDDs) and furans (PCDFs) are unintentional by-products of industrial and combustion processes. The annual dioxin/furan emission inventory in Hong Kong for the year 2003 was compiled based on the framework presented in the “UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases”. A summary of annual dioxin/furan emission inventory in Hong Kong for the year 2003 (with breakdown on subcategories and individual classes of activity) is presented in Table 4.

Table 4 Summary of Annual Dioxin/Furan (PCDD/F) Emission Inventory in Hong Kong for the Year 2003 – A Breakdown on Subcategories and Individual Classes of Activity

Cat.	Source Categories	Annual Release (g TEQ/a) †					All Routes † (g TEQ/a)
		Air	Water	Land	Products	Residues	
1.	Waste Incineration	0.008	0.000	0.000	0.000	0.057	0.065
	Hazardous waste incineration (high technology combustion, sophisticated APCS)	0.003				0.024	0.027
	Medical/hospital waste incineration (controlled batch combustion, good APCS)	0.005				0.034	0.038
2.	Ferrous and Non-Ferrous Metal Production	0.272	0.000	0.000	0.000	7.700	7.972
	Iron/steel foundries and Brass/bronze production	0.002					0.002
	Aluminum production (secondary) (scrap treatment, well-controlled, fabric filter, lime injection)	0.270				7.700	7.970
3.	Power Generation and Heating/Cooking	1.549	0.000	0.000	0.000	3.692	5.242
	Fossil fuel power plants	1.214				3.692	4.907
	<i>Coal fired power boilers (pulverized fuel power plants with EP of 99% removal efficiency)</i>	1.182				3.692	
	<i>Heavy fuel fired power boilers (pulverized fuel/fuel oil fired power plants with EP of 99% removal efficiency)</i>	0.005					
	<i>Light fuel oil/Natural gas fired power boilers (natural gas fired plants, combined cycle gas turbine)</i>	0.027					
	Landfill and biogas combustion	0.037					0.037
	<i>Biogas-fired boilers, motors/turbines and flaring</i>	0.037					
	Domestic heating - Fossil fuels	0.298					0.298
	<i>Coal fired stoves</i>	0.017				ND	
	<i>Oil fired stoves</i>	0.231					
	<i>Natural gas fired stoves</i>	0.051					
4.	Production of Mineral Products	0.009	0.000	0.000	0.000	0.074	0.082
	Asphalt mixing (mixing plants with fabric filter, wet scrubber)	0.009				0.074	0.082
5.	Transport*	0.117*	0.000	0.000	0.000	0.000	0.117*
	4-Stroke engines	0.002					0.002
	<i>Unleaded fuel without catalyst</i>	0.002					
	<i>Unleaded fuel with catalyst</i>						
	2-Stroke engines	0.0004					0.0004
	<i>Unleaded fuel without catalyst</i>	0.0004					
Diesel engines	0.114					0.114	
Heavy oil fired engines (All types)*	12.087*					12.087*	
6.	Uncontrolled Combustion Processes	0.312	0.000	0.048	0.000	0.213	0.573
	Fires/burnings - biomass	0.060		0.048			0.109
	<i>Forest fires</i>	0.030		0.024			
	<i>Grassland and moor fires</i>	0.030		0.024			
	Fires, waste burning, landfill fires, industrial fires, accidental fires	0.251				0.213	0.464
	<i>Accidental fires in houses, factories</i>	0.204				0.204	
	<i>Accidental fires in vehicles (per vehicle)</i>	0.046				0.009	
<i>Open burning of wood (construction/demolition)</i>	0.002				0.000		
7.	Production of Chemicals, Consumer Goods	0.000	0.000	0.000	ND	0.000	0.000
8.	Miscellaneous	0.347	0.000	0.000	0.000	0.065	0.412
	Crematoria	0.347				0.065	0.412
	<i>No control plants (old plants in service for >20 years)</i>	0.219					
	<i>Medium control plants (modest pollution control incorporated in furnace design)</i>	0.127				0.040	
	<i>Optimal control plants (advanced furnace design with combustion control and exhaust cleaning equipment)</i>	0.000				0.025	
	Dry cleaning residues					0.0009	
	Tobacco smoking	0.0004					0.0004
<i>Cigar</i>	0.000						
<i>Cigarette</i>	0.000						
9.	Disposal/Landfill	0.000	0.855	0.000	0.062	4.895	5.812
	Landfill leachate		0.005				0.005
	<i>Non-hazardous waste</i>		0.005				
	Sewage/sewage treatment		0.850			4.895	5.745
	<i>Sewage - Mixed industrial, commercial and domestic</i>		0.850				
	<i>No sludge removal</i>		0.790				
	<i>With sludge removal</i>		0.060				
	<i>Sludge - Mixed industrial, commercial and domestic</i>					4.895	
	<i>CEPT</i>					3.603	
	<i>Secondary treatment</i>					1.291	
Composting				0.062		0.062	
<i>Livestock wastes</i>				0.062			
1-9.	Total (g TEQ/a) (excluding Cat. 5 - bunker fuel consumption) †	2.613	0.855	0.048	0.062	16.696	20.274

† Values may not add up to "total" due to rounding

* Not included in the annual dioxin emission estimate 2003; the sale of bunker fuel to international ocean-going vessels is not considered representative of local fuel consumption

APCS = air pollution control system; EP = electrostatic precipitator; ND = no data

In 2003, there was an annual release of 20.3 g TEQ dioxins/furans to the environment via all vectors. Relative contributions of different categories are shown in Figure 1. The top 3 contributing categories of dioxin/furan emission were “Ferrous and Non-Ferrous Metal Production” (39.3%), “Disposal/Landfill” (28.7%) and “Power Generation and Heating/Cooking” (25.9%). Together, they represented 93.9% of the total. A “zero” emission value was assigned to Cat. 7 “Production of Chemicals, Consumer Goods” due to a general lack of local data on the contamination level of dioxins/furans in consumer goods.

On a vector basis (Figure 2), the major route of release was “residues”, responsible for 82.4% of the total, followed by “air” (12.9%) and “water” (4.2%). The “land” and “products” together contributed to only 0.5% of the total annual release. It was observed that for the “land” and “products” vectors, a “blank” release value was assigned to many classes of potential emission sources due to a general lack of data on emission factors.

Figure 1 – Contribution of Various Emission Source Categories to Annual Dioxin/Furan Emission

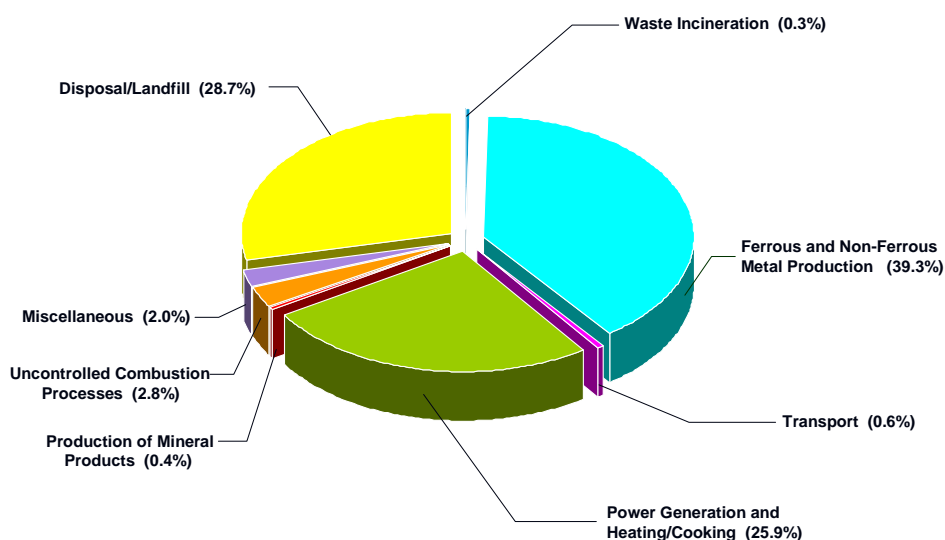
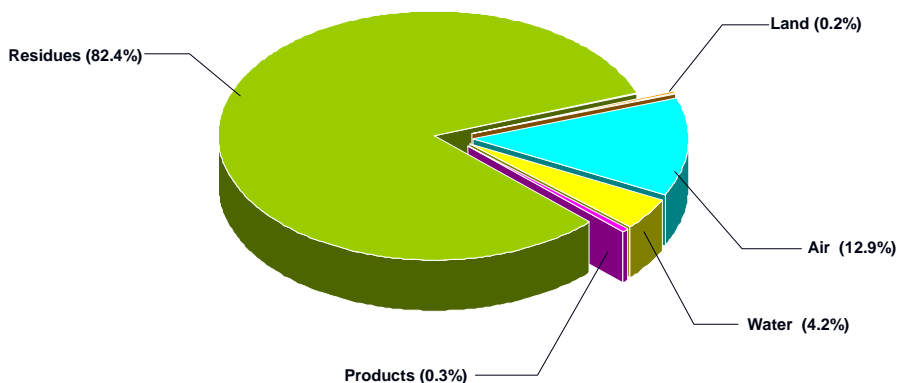


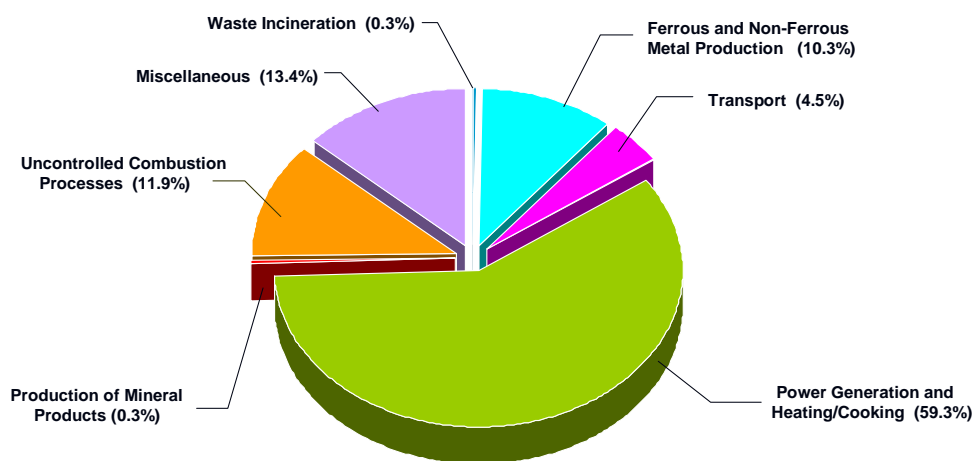
Figure 2 – Percentage of Dioxin/Furan Emission on a Vector Basis



Release of Dioxins/Furans to Air

The 2003 annual dioxin/furan release to the atmosphere was 2.61 g TEQ. The relative contributions of different source categories to air emission are presented in Figure 3. A further breakdown of the nine categories into individual classes of emission sources revealed that the top 4 contributing classes of local processes were: (a) “coal fired power boilers plants” (45.3%) in the “Power Generation and Heating/Cooking” category (59.3%), (b) “crematoria” (13.4%), sole contributor in the “Miscellaneous” category (13.4%), (c) “aluminium production (secondary)” (10.3%), sole contributor in the “Ferrous and Non-Ferrous Metal Production” category (10.3%), and (d) “accidental fires - houses, factories and vehicles” (9.6%) in the “Uncontrolled Combustion Processes” category (11.9%). These four classes of processes together accounted for 78.6% of the total annual air emission while the other 18 classes were responsible for the remaining 21.4%.

Figure 3 – Contribution of Different Source Categories to Annual Dioxin/Furan Emission to Air



Contributions from the “coal fired power boilers plants” and “crematoria” were well characterized and the emissions were calculated based on locally developed emission factors (EFs). Estimates of local dioxin/furan emission from the “aluminium production (secondary)” and “accidental fires” activities were made by adopting the generic EFs published in the UNEP Standardized Toolkit (2003). Considering that the reported local annual aluminium production (secondary) activity also appeared unusually high compared with the values reported in Asian and European regions, the annual dioxin/furan emission from this class of industrial activity would likely be over-estimated. While the contribution from “accidental fires” could hardly be controlled, efforts to establish a more representative local annual activity and emission level from the “aluminium production (secondary)” process would help to better understand and assess the performance of the industry and its contribution to local air dioxin/furan release.

Release of Dioxins/Furans to Water

The 2003 annual dioxin/furan release to the local marine environment was 0.86 g TEQ, contributed solely by the “Disposal/Landfill” category. Within this category, the two major contributing classes of emission sources were “sewage with no sludge removal” (92.4%) and “sewage with sludge removal” (7.0%), together accounting for 99.4% of the total release, while the landfill leachate contributed to only a minor 0.6%. Given the limited local data available and considering the large quantities of annual sewage production in Hong Kong, further analysis of sewage discharges at source would help to better estimate their contribution to annual dioxin/furan release.

Stormwater discharge was recognized as a potential non-point water release source to “open water dumping”. However, in the absence of local information on the annual stormwater volume and the level of dioxin/furan contamination, its contribution to total water dioxin/furan release could not be estimated. Sediment dredging and dumping of contaminated mud in controlled disposal pits would be another potential source of POPs release to “open water”.

Release of Dioxins/Furans to Land

For release “to land”, the only category with an EF available was “Uncontrolled Combustion Processes”. Burning of biomass in forest/grassland fires contributed to the total annual release of 0.05 g TEQ dioxins/furans to land. There was a general lack of local information on other potential sources of dioxin/furan release to land.

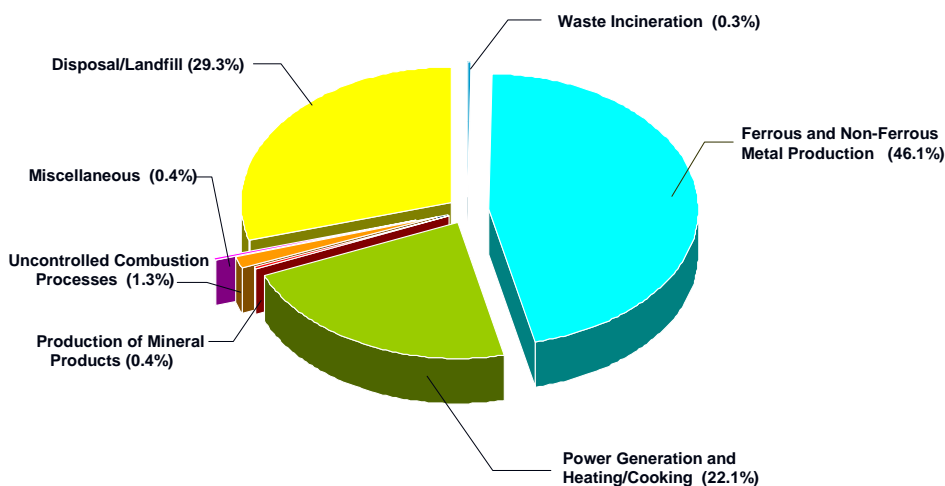
Release of Dioxins/Furans in Products

The 2003 annual dioxin/furan release “in products” was 0.06 g TEQ, from the “Disposal/Landfill” category. Within this category, the sole contributing class of emission sources was “composting of livestock wastes”. Release from composting of livestock wastes was estimated using an UNEP generic EF for composting of garden and kitchen wastes as surrogate. A local EF specific to livestock waste would need to be determined for a better estimate of contribution from this class of emission source. The compost was used as product for landscaping and horticulture work. There was a general lack of local information on other potential sources of dioxin/furan release in products.

Release of Dioxins/Furans in Residues

The 2003 annual dioxin/furan release “in residues” was 16.7 g TEQ. The relative contributions of different source categories to emission in residues are presented in Figure 4. A further breakdown of the nine categories into sub-categories and individual classes of release sources revealed that the top three contributing sub-categories/classes of local processes were: (a) “aluminium production (secondary)” (46.1%), the sole contributor in the “Ferrous and Non-Ferrous Metal Production” category (46.1%), (b) “disposal of sludge from sewage treatment works” (29.3%), the sole contributor in the “Disposal/Landfill” category (29.3%), and (c) “coal fired power boilers plants” (22.1%), the sole contributor in the “Power Generation and Heating/Cooking” category (22.1%). These three classes of processes together accounted for 97.5% of the total annual dioxin/furan release in residues.

Figure 4 – Contribution of Different Source Categories to Annual Dioxin/Furan Emission to Residues



Estimates of annual dioxin/furan release from the “aluminium production (secondary)”, “sludge disposal” and “coal fired power boiler plants” activities were made by adopting the generic EFs published in the UNEP Standardized Toolkit (2003). In view of their significant relative contribution to the residue dioxin/furan release profile, the use of specific, local EFs would help to better estimate their annual emissions. Since all sludge produced from sewage treatment works was currently disposed of in landfills, the landfills would act as an environmental sink for release of dioxins/furans in residues. A small proportion of the boiler ash (residues) produced in coal fired power plants would be reused in concrete batching or in non-structural concrete such as paving blocks and road base site formation/reclamation, while the majority of it would be disposed of on-site in designated ash lagoons acting as another environmental sink for the release of dioxins/furans in residues. The percentage reuse of local boiler ash in “products” would warrant further investigation.

2.3.1.2.2 *Hexachlorobenzene*

There was comparatively little information on the release of HCB as an unintentionally produced POP from combustion and/or as an intermediate during industrial processes in Hong Kong. HCB is used as a raw material for the production of many agricultural chemicals such as pentachlorophenol (PCP), quintozone (PCNB), chlorthal-dimethyl (TCTP), chlorothalonil and picloram, and remains as an impurity in these products. Apart from PCP, all other four

agricultural chemicals are registered pesticides in Hong Kong. Records of their trading for the period 2000-2004 revealed that PCNB and chlorothalonil had been imported for local use. In the absence of information on the actual percentage of HCB as impurity in any of these pesticides, the potential annual release of HCB as an unintentional by-product to the local environment due to their domestic applications could not be estimated. However, the relative contribution was likely to be insignificant.

2.3.1.2.3 Polychlorinated Biphenyls

Similar to HCB, there was comparatively little local information on the release of PCBs as unintentionally produced POPs. PCBs are known to be produced as unintentional combustion by-products of incineration and combustion processes. The current UNEP Toolkit does not give EFs for PCBs. Local information on the release of PCBs from known emission sources is scanty. Some measured emission data were available from a number of incinerators, crematoria and power plants to permit local EFs to be derived and annual releases of dioxin-like PCBs to be estimated for these processes. Results indicated that the measured total annual air emission of dioxin-like PCBs was very low (less than 0.1 g TEQ).

2.3.1.3 Contaminated Sites

Three local dioxin-contaminated historical activity sites were identified and documented by EPD during 2000-2004. The Choy Lee Shipyard site (located at Penny's Bay in Lantau Island) was the major contaminated site, contributing to 98.6% of the estimated total dioxin stockpile due to historical improper open burning of waste materials on-site. Decontamination of the Choy Lee Shipyard site and incineration of all dioxin-residue recovered from the contaminated soil at the Chemical Waste Treatment Centre (CWTC) was completed in March 2005. The other two minor contaminated sites were phased-out incineration plants at Kwai Chung, the New Territories and Kennedy Town, Hong Kong Island. Together, they were responsible for only 1.4% of the estimated total dioxin stockpile. There were no known existing sites contaminated by PCBs or POPs pesticides in Hong Kong. As noted above, the landfills and the confined contaminated mud disposal facility at East Sha Chau would represent potential sinks of POPs, not posing immediate threats to the environment or human health.

2.3.2 **Environmental Levels of POPs**

2.3.2.1 Contamination Levels of POPs in Environmental Media

The major sources of information that contributed to the inventory on environmental levels of POPs in Hong Kong include: reports of EPD's routine monitoring programmes, Government-funded consultancy studies and studies conducted by local academia. A summary of POPs analyzed and reported in environmental media (ambient air, surface water, surface sediment and soil, and vegetation) for 2000-2004 is presented in Table 5. The mean environmental levels of POPs were weighted arithmetic sample means calculated based on samples analyzed and reported in individual studies.

Table 5 Mean Levels of POPs Contamination in the Environment of Hong Kong for the Period 2002 – 2004^a

Chemical	Ambient Air ^b (ng/m ³)	Surface Water (ng/L)	Surface Sediment (µg/kg dw)		Surface Soil ^c (µg/kg dw)	Vegetation (µg/kg dw)	
		Marine Water ^c	Marine Sediment ^c	River Sediment		Ground Vegetation	Tree Bark
Aldrin	0	0	4.70 (1.30 – 9.2)				
Chlordane		0	4.20 (<0.01 – <10.0)				
DDT	0.05 (0 – 0.10)	0	6.81 (0.30 – 33.1)	4.96 (2.82 – 8.63)	0.52 (<0.004 – 6.00)		
Dieldrin	0	0	5.19 (2.40 – 11.0)				
Endrin	0	0	3.86 (<0.01 – <10.0)		0.01 (<0.004 – 0.10)		
Heptachlor	0.03 (0 – 0.09)	0	4.48 (<0.01 – <10.0)				
HCB	0.16 (0.05 – 0.23)	0	5.98 (0.05 – 23.8)		0.01 (<0.001 – 0.30)		
Mirex		0	0				
Toxaphene		0	0				
PCBs	0.48 (0.01 – 1.81)	0	24.1 (0.63 – 330)	193 (43.0 – 461)	0.10 (<0.004 – 0.16)		
Dioxins / Furans*	0.06 (0.04 – 0.35)	0.55 [†] , 5.21 [‡] (0.0005 – 24.4)	9.10 (2.28 – 38.7)		5.33 (0.35 – 32.8)	2.13 (0.29 – 14.1)	1.47 (0.49 – 3.57)

- * : Unit of dioxins/furans in ambient air = pg I-TEQ/m³; in surface water = pg I-TEQ/L; in surface sediment/surface soil/vegetation = ng I-TEQ/kg dw
- a : Results are expressed as mean (minimum, maximum) values
- b : “0” indicates values were < DL; DL of pesticides in ambient air = 0.02 ng/m³; If mixed values of >DL and <DL were recorded in a sample pool, mean value was calculated by assuming “0” for samples <DL
- c : “0” indicates values were < DL; DL of DDT, all other pesticides and PCB in marine water = 15, 10 and 100 ng/L, respectively; DL of mirex and toxaphene in marine sediment = 10 µg/kg dw; If mixed values of >DL and <DL were recorded in a sample pool, mean value was calculated by assuming “0.5DL” for sample <DL
- † : The value was calculated assuming zero for individual congener level < DL; 2,3,7,8-TCDD < DL in all 104 samples
- ‡ : The value was calculated assuming 0.5 DL for individual congener level < DL

2.3.2.1.1 *Ambient Air*

Ambient levels of total PCBs and dioxins/furans (PCDD/Fs) have been routinely monitored at two general urban locations (Tsuen Wan and Central & Western) in Hong Kong since mid-1997. In addition, dioxin data collected from a year-long dioxin-monitoring project (2000-2004) that targeted suspected local emission source at Tsing Yi (where CWTC is located) and from an *ad hoc* study conducted at Tai Mo Shan (2000-2001) were included in the calculation of the mean ambient air dioxin/furan concentration. The average local ambient air concentrations of PCBs and dioxins/furans measured for 2000-2004 were 0.48 ng/m³ and 0.06 pg I-TEQ/m³, respectively.

Data of local ambient air POPs pesticides were limited. The ambient air levels of aldrin, DDT, dieldrin, endrin, heptachlor and HCB reported were *ad hoc* measurements taken in a single sampling event at the Tai Mo Shan Station, a rural site at the highest point (~957 m above sea level) in Hong Kong. Relatively low levels of DDT (0.05 ng/m³), heptachlor (0.03 ng/m³) and

HCB (0.16 ng/m³) in the ambient air were detected.

2.3.2.1.2 Surface Water

Data on marine water POPs were mainly generated by a major consultancy study on toxic substances pollution in Hong Kong commissioned by EPD (1999-2003). The 2004 EPD in-house toxic substance monitoring programme and a number of studies conducted by local academia also contributed to the inventory, especially on the marine water levels of DDT, PCBs and dioxins/furans. None of the nine POPs pesticides was detected at any of the sampling sites. The level of PCBs was also reported to be below detection limit in 180 water samples analyzed from 38 sites located throughout Hong Kong. The 2,3,7,8-TCDD was not detected in any of the 104 local marine water samples analyzed in 2000-2004. The calculated mean concentration of dioxins/furans was 0.55 (lower bound, assuming zero for individual congener level <DL) and 5.21 (upper bound, assuming 0.5 DL for individual congener level <DL) pg I-TEQ/L, respectively. There were no data available on the level of POPs in inland waters of Hong Kong.

2.3.2.1.3 Surface Sediment

Contamination of local marine sediment by toxic chemical pollutants has been relatively well documented. The POPs marine sediment inventory was compiled based primarily on data generated from a major consultancy study on local toxic substances pollution reported in 2003, EPD's routine and *ad hoc* marine monitoring programmes of 2003/2004, and study reports published by local academia. With the exception of mirex and toxaphene, all other POPs pesticides were detected in the marine sediment sampled at over 20 locations throughout Hong Kong. The mean sediment pesticide concentrations ranged <DL – 6.81 µg/kg dw, and DDT (6.81 µg/kg dw), HCB (5.98 µg/kg dw) and dieldrin (5.19 µg/kg dw) were found to be the major POPs pesticide contaminants. PCBs and dioxins/furans were widely distributed, with sediment levels ranging 0.63 – 330 µg/kg dw and 2.28 – 38.7 ng I-TEQ/kg dw for PCBs and dioxins/furans, respectively.

Local information on POPs in river sediments was sketchy. One study of the inland water systems in Hong Kong was conducted by the local academia and the available data were reported in this inventory. Fifteen river sediment samples were taken at sediment sites along the three main local rivers (Shing Mun River, Tai Po River and Lam Tsuen River in the New Territories) and analyzed for DDT and PCBs. The mean level of DDT contamination was 4.96 µg/kg dw, while that of PCB contamination was 193 µg/kg dw.

2.3.2.1.4 Surface Soil

The soil POPs pesticide inventory was compiled based on an *ad hoc* territory-wide background monitoring of surface soil in Hong Kong jointly conducted by the Nanjing Institute of Soil Sciences, Chinese Academy of Sciences and the Croucher Institute for Environmental Sciences, Hong Kong Baptist University. Rural surface soil samples were collected from 46 locations across the region, mostly woodland and grassland, and analyzed for DDT, endrin, HCB and PCBs. Contamination levels of POPs pesticides in the soil were generally very low, with mean values ranging from 0.01 (endrin and HCB) to 0.52 µg/kg dw (DDT). The mean soil PCB

concentration was 0.1 µg/kg dw which was 241 times and 1,930 times lower than those reported for marine and river sediments, respectively. Dioxins/furans were measured in an EPD-commissioned consultancy monitoring project in 2001/2002 that targeted potential local dioxin emission sources. Forty soil samples were taken at five locations near landfills, CWTC or livestock waste composting sites. Soil concentrations of dioxins/furans ranging 0.35 – 32.8 ng I-TEQ/kg dw were reported.

2.3.2.1.5 Vegetation

Levels of dioxins/furans in ground vegetation and tree barks were measured in an EPD-commissioned consultancy monitoring project in 2001/2002 that targeted suspected local dioxin emission sources. Forty samples of ground vegetation and 10 samples of tree barks were taken at five locations near landfills, CWTC or livestock waste composting sites. The mean levels of dioxins/furans in ground vegetation and tree barks at potential local dioxin emission sources were 2.13 and 1.47 ng I-TEQ/kg dw, respectively. No data on POPs pesticides in local vegetation were available.

2.3.2.2 Contamination Levels of POPs in Aquatic Biota

A summary of POPs analyzed and reported in representative freshwater and marine biota (fish, shellfish, water bird eggs and marine mammals) is presented in Table 6. The mean tissue levels of POPs were weighted arithmetic genus means calculated based on tissue samples analyzed and reported in individual studies.

Table 6 Mean Levels of POPs Contamination in Aquatic Biota of Hong Kong for the Period 2002 – 2004^a

Chemical	Freshwater Fish ^b (µg/kg ww)	Marine Fish ^b (µg/kg ww)	Marine Shellfish ^b (µg/kg ww)	Water Bird Eggs (µg/kg ww)	Marine Mammals (µg/kg ww)
Aldrin	0	28.9 (0.08 – <100)	0		
Chlordane		3.80 (0.39 – 16.4)	1.12 (0.11 – 5.02)	156 (31.0 – 280)	
DDT	6.78 (3.32 – 10.9)	27.6 (0.83 – 99.0)	7.73 (0.16 – 28.6)	900 (600 – 1,200)	32,763
Dieldrin	0	2.18 (<0.08 – 15.8)	0.21 (<0.01 – 0.40)		
Endrin	0	28.1 (0.14 – <100)	5.86 (<0.01 – 25.2)		
Heptachlor	0	25.3 (0.18 – <100)	5.99 (<0.01 – 25.1)		
HCB		5.8 (<0.20 – 18.1)	0.80 (0.13 – 3.43)		
Mirex		0	0		178 (70.5 – 286)
Toxaphene		1.33 (0.25 – 2.36)	0		32.0 (19.7 – 44.2)
PCBs	57.8	22.6 (<2.00 – 153)	13.8 (<1.00 – 55.0)	595 (230 – 960)	8,190
Dioxins / Furans*		0.33 (0.09 – 0.57)	0.53 (0.21 – 0.85)		

* : Unit of dioxins/furans = ng I-TEQ/kg ww

a : Results are expressed as mean (minimum, maximum) values

b : “0” indicates values were <DL; DL of pesticides in freshwater fish = 0.10 µg/kg ww; DL of aldrin/mirex and toxaphene in marine

fish/shellfish = 100 and 0.2 µg/kg ww, respectively; If mixed values of >DL and <DL were recorded in a sample pool, mean value was calculated by assuming "0.5DL" for sample <DL

2.3.2.2.1 Freshwater Fish

There was a general paucity of information on POPs in freshwater biota. Studies reported by local academia contributed to all the data compiled in this section of the inventory. Four freshwater fishes from a few (1-3) sampling sites were analyzed. DDT was the only POPs pesticide detected, with tissue concentration ranging 3.32 – 10.9 µg/kg ww. PCBs were measured in only one fish species from two locations and mean tissue level of 57.8 µg/kg ww was reported.

2.3.2.2.2 Marine Fish and Shellfish

Compared with freshwater fish, more information on POPs in local marine fish and shellfish were available. Data were retrieved primarily from two toxic substances consultancy studies reported in 2003, the 2003 EPD *ad hoc* baseline survey on trace toxics in Hong Kong marine biota, and the 2004 CEDD Environmental Monitoring and Audit for Contaminated Mud Pit IV at East Sha Chau. Studies by local academia also contributed significantly to the data pool. Most POPs pesticides were detected in a variety of marine fish and shellfish sampled at multiple sites throughout Hong Kong. DDT, endrin and heptachlor were found to be the major POPs pesticide contaminants of both marine fish and shellfish, while aldrin was prominent only in the marine fish.

The mean concentrations of PCBs in local marine fish and shellfish were 22.6 and 13.8 µg/kg ww, respectively. Dioxins/furans were detected in all fish and shellfish genera examined. The mean level of dioxin/furan contamination was 0.33 ng I-TEQ/kg ww in marine fish and 0.53 ng I-TEQ/kg ww in marine shellfish. With the exception of dioxins/furans, the level of POPs contamination was found to be generally higher in marine fish than in marine shellfish.

2.3.2.2.3 Water Bird Eggs

One local study of body burden of POPs in local water birds measured the level of chlordane, DDT and PCBs in the eggs of two species of water birds sampled at two locations in the New Territories. Relatively high levels of all three POPs were detected, with average genus concentrations of 156 µg, 900 µg and 595 µg per kg ww for chlordane, DDT and PCBs, respectively.

2.3.2.2.4 Marine Mammals

Levels of POPs in two local marine mammals, the Indo-Pacific humpback dolphin (*Sousa chinensis*) and finless porpoise (*Neophocaena phocaenoides*), were measured in two studies of stranded cetaceans (1995-2000 and 2000-2001) published in the open literature. Blubber tissue samples were collected from stranded animals found in Hong Kong and analyzed for DDT, mirex, toxaphene and PCBs. High mean blubber concentrations of DDT (32.8 mg/kg ww) and PCBs (8.19 mg/kg ww) were reported.

2.3.3 Dietary Exposure to POPs

Human exposure to POPs through dietary intake was estimated based on measurements of contamination levels of POPs in various foods and information on daily diets of the local population.

In 2000, the Food and Environmental Hygiene Department (FEHD) conducted a food consumption survey in local secondary school students to obtain consumption data on individual food items using a food frequency questionnaire. Using data from the survey, a dietary exposure study to dioxins of secondary school students was carried out in 2002. Dietary exposure to dioxins for an average secondary school student was estimated to be 0.85 pg WHO-TEQ/kg bw/day, while that for high consumers was 2.07 pg WHO-TEQ/kg bw/day. Both levels fell within the Tolerable Daily Intake Limit (1-4 pg TEQ/kg bw/day) established by WHO in 1998, suggesting that secondary school students in Hong Kong were unlikely to experience toxicological effects of dioxins. FEHD commissioned another study on dietary exposure to DDT in secondary school students in 2005 and the results are expected to be available in early 2006.

Contamination levels of POPs in locally consumed foods are monitored year-round by FEHD under a routine food surveillance programme. Food items (mainly imports from the Mainland and other countries) are sampled regularly from local market stalls, supermarkets, fresh provision shops, food wholesalers and at the points of entry into Hong Kong. Analysis of the levels of toxic chemical contamination is carried out by the Government Laboratory (GL). Table 7 presents summaries of contamination levels of POPs in eight main locally consumed food groups and estimates of daily dietary exposure of Hong Kong residents to POPs for the year 2003.

Table 7 Estimates of Dietary Exposure to POPs Contamination in Foods of Hong Kong for the Year 2003

	Cereals	Vegetables	Fruits	Dairy Products	Eggs	Seafoods	Meats	Poultry	Daily Consumption / Exposure
Food Consumption (g/capita/day) ^a	445.7	340.3	186.3	66.3	22.2	122.5	33.3	26.3	1,242.9
Contamination Level (µg/kg food) ^b									
Aldrin	0	0	0	0			0		
Chlordane	0	0	0	0		0	0	0	
DDT	0.85	0	0.14	1.00		10.5	0	0	
Dieldrin	0	0	0	0			0		
Endrin		0	0						
Heptachlor	0	0	0	0		0	0	0	
HCB	0.15	0	0	0		0	0	0	
Mirex		0	0						
PCBs			0	0		4.07	0	0	
Dioxins/Furans (pg TEQ/g food)	0.015			0.100	0.137	0.285	0.001	0.131	
Estimated Daily Exposure (ng/kg bw/day) ^c									
Aldrin	0	0	0	0			0		0
Chlordane	0	0	0	0		0	0	0	0
DDT	6.31	0	0.43	1.11		21.4	0	0	29.3
Dieldrin	0	0	0	0			0		0
Endrin		0	0						0
Heptachlor	0	0	0	0		0	0	0	0
HCB	1.11	0	0	0		0	0	0	1.11
Mirex		0	0						0
PCBs			0	0		8.31	0	0	8.31
Dioxins/Furans (pg TEQ/kg bw/day)	0.110			0.111	0.051	0.582	0.001	0.057	0.91

^a: Due to the lack of local data, food consumption patterns of Far East Countries (including China) published by WHO (2003 in "GEMS/Food Regional Diets") were adopted for estimation of daily dietary exposure

^b: "0" indicates values were < DL; DL of pesticides and PCB = 0.005 mg/kg; DL of dioxins/furans = 0.02/0.05/0.10 ng/kg for individual congeners

^c: Estimate was based on an average adult body weight of 60 kg

With the exception of DDT and HCB, POPs pesticides were not detected in most food groups. DDT was found in four of the eight main food groups (cereals, fruits, dairy products and seafoods) while HCB was detected in cereals only. PCBs were not detected in fruits, dairy products, meats or poultry, but found in seafood items at a mean concentration of 4.07 µg/kg food. Measurable levels of dioxins/furans were found in cereals, dairy products, eggs, seafoods, meats and poultry, with mean dioxin/furan levels ranging from 0.001 (meats) to 0.285 (seafoods) pg TEQ/g food. Dioxins/furans were not measured in vegetable and fruit items sampled in 2003.

As comprehensive local food consumption data at the population level was currently not available, the food consumption patterns of Far East countries (including China) published by

WHO in 2003 were adopted for a rough estimation of human exposure to POPs through the dietary intake pathway. Dietary exposure of Hong Kong residents to DDT, HCB, PCBs and dioxins/furans was estimated to be 29.3 ng, 1.11 ng, 8.31 ng and 0.91 pg-TEQ per kg bw per day, respectively. The major food groups contributing to POPs exposure were cereals, seafoods and dairy products.

While acknowledging that there is a general lack of local food consumption data on the population level, FEHD has initiated a population-based food consumption survey and the results are expected to be available around 2008. Based on results of the survey, a more accurate assessment of dietary exposure of local residents to POPs will be performed at the population level.

2.3.4 Human Body Burden of POPs

POPs in the environment can enter the food chain, bio-accumulate and bio-magnify as they move up the trophic levels and ultimately end up in the human body. It is expected that POPs will continue to accumulate in the body fat and their average concentrations will increase with age. Levels of POPs in human blood/serum and breast milk can serve as good indicators of their body burden.

2.3.4.1 Human Breast Milk

Local data on levels of POPs in breast milk of lactating mothers were reported in two studies of Hong Kong residents, including a study conducted by local academia as part of the 3rd Round WHO/EURO Exposure Study 2002-03. Table 8 presents a summary of POPs contamination in breast milk of lactating mothers in Hong Kong for 2000-2003. In total, 115 local lactating mothers (aged 22-46, during their weeks 3-5 postpartum) participated in the milk sampling for analysis of DDT and PCBs and 316 local lactating mothers (aged 18-42, during their weeks 2-6 postpartum) contributed milk samples for analysis of dioxin-like PCBs and dioxins/furans. The mean human breast milk concentrations of DDT and indicator PCBs were 2.68 and 0.04 µg/g lipid wt, respectively, and those of dioxin-like PCBs and dioxins/furans were 4.67 and 8.25 pg TEQ/g lipid wt, respectively.

Table 8 Mean Levels of POPs Contamination in Breast Milk of Hong Kong Mothers for the Period 2000 - 2002

Chemical	Human Breast Milk Concentration	
	No. of Participants	Mean (Min, Max)
DDT (µg/g lipid wt.)	115	2.68 (0.66 - 5.61)
PCBs (µg/g lipid wt.)	115	0.04 (0.01 - 0.07)
Dioxin-like PCBs (pg TEQ/g lipid wt.)	316	4.67 (2.80 - 6.58)

Dioxins / Furans (pg TEQ/g lipid wt.)	316	8.25 (5.80 - 10.1)
---------------------------------------	-----	-----------------------

2.4 Analysis of POPs Inventory Data Gaps

2.4.1 Source Inventories on POPs

2.4.1.1 Trade, Production and Use of Intentional POPs

The POPs inventory on domestic use of industrial chemicals was incomplete. The inventory did not include estimates of PCBs in use/stockpile in consumer products (e.g. small old electrical appliances/parts, electronics, impact papers, adhesives, sealants, plastic materials and paints) due to a lack of information on their product content of PCBs. In view of the minute quantities of PCBs likely be present, the relative contribution from this category to PCBs in use/stockpile is judged to be insignificant. Although there is no existing information on the quantities of HCB used as an industrial chemical in Hong Kong, an initial survey conducted by EPD in early 2005 indicates little current trading and/or domestic usage of the chemical.

2.4.1.2 Release of Unintentional POPs as by-Products

As the inventory was compiled based on existing information, there were incomplete documentation of local industrial/commercial/urban activities and/or limited analytical data on the level of POPs contamination in some classes of emission sources. Efforts to establish more representative local EFs and/or annual activities would help to better assess the performance of the local emission sources and their relative contributions to the local dioxin/furan emission profile. This would be particularly relevant to emission sources identified as potential major contributors, for example, the “*aluminium production (secondary)*” (for its emission “to air” and “in residues”), the “*sewage discharges*” and “*sludge disposal from sewage treatment works*” (for its emission “to water” and “in residues”), and the “*coal fired power boiler plants*” (for its emission “in residues” and “in products”).

Stormwater discharge was recognized as a potential non-point source of dioxin/furan release “to water” in the “Open water dumping” category. Collating an inventory of annual stormwater volume and its level of dioxin/furan contamination would be an expensive and challenging task and could only be achieved through careful planning and mobilization of adequate resources.

It was observed that for the “to land” and “in products” vectors, a “blank” release value was assigned to many classes of potential emission sources due to a general lack of data on local activities and/or EFs (local or generic). This was judged to be responsible, at least in part, for their apparent low contributions to total annual dioxin/furan release.

There was comparatively little information on the release of HCB as an unintentionally produced POP from combustion and/or as an intermediate during industrial processes in Hong Kong. Trade records showed that two agricultural chemicals known to contain HCB as impurity had been imported for local use in the past five years. Although contribution of local usage of these

pesticides to the annual HCB release profile could not be readily quantified, its role was likely to be insignificant.

The current UNEP Toolkit does not give EFs for PCBs. Only a few locally measured emission data of PCBs were available and the results indicated that the measured total annual air emission of dioxin-like PCBs was very low (less than 0.1 g TEQ). Compilation of the local dioxin-like PCB emission profile would await further emission data from all other potential sources.

2.4.1.3 Contaminated Sites

The landfills and the confined contaminated mud disposal facility at East Sha Chau would represent local potential sinks of POPs, posing no immediate threats to the environment or human health but should continue to be kept under surveillance through environmental monitoring and auditing.

2.4.2 **Environmental Levels of POPs**

2.4.2.1 Contamination Levels of POPs in Environmental Media

The database on baseline monitoring of POPs contamination levels in environmental media was incomplete. Not all 12 Convention POPs were routinely monitored in the ambient air, water and sediment. Local data on POPs in river sediments, surface soil and vegetation were particularly sketchy.

2.4.2.2 Contamination Levels of POPs in Aquatic Biota

The contamination level of POPs (DDT and PCBs in particular) in local marine fish and shellfish had been well studied, with the exception of perhaps dioxins/furans for which data of only a few genera were available. However, there was a general paucity of information on POPs in local freshwater biota. This could be accounted for, at least in part, by the fact that most of Hong Kong's major inland rivers had been channelized and there appeared to be a general lack of freshwater biota, especially in the downstream segments. Only limited data of body burden of POPs in local water birds and marine mammals were available.

2.4.3 **Dietary Exposure to POPs**

The database on routine surveillance of POPs contamination levels in locally consumed foods was incomplete. Not all 12 Convention POPs were adequately analyzed in all main locally consumed food groups (food items of animal origin in particular). There was a general lack of food consumption data on the population level. Estimates of daily dietary exposure of local residents to POPs for the year 2003 were mostly derived based on generic regional food consumption patterns (WHO GEMS/Food Regional Diets 2003) not specific to Hong Kong. To better understand the local situation and to assess the overall dietary exposure of the local population to POPs, there would be a need to include analysis of all 12 Convention POPs in the routine food surveillance programme and to conduct a food consumption survey to determine the food consumption patterns of the local residents. To address this issue, a population-based local

food consumption survey has recently been commissioned by FEHD.

2.4.4 Human Body Burden of POPs

Local data on the contamination level of selected POPs (DDT, PCBs, dioxin-like PCBs and dioxins/furans) in breast milk of lactating mothers were reported in two studies of Hong Kong residents. Data of other POPs pesticides in human breast milk were not available. No information on the level of POPs in blood/serum of local residents existed. Contamination levels of POPs in human breast milk and in blood/serum can both serve as good indicators of their body burden. To better assess the body burden of POPs contamination in the Hong Kong population, it would be beneficial to measure all 12 Convention POPs in both the breast milk and plasma/serum of local residents.

2.5 Environmental and Human Health Risk Assessment of POPs

2.5.1 Comparison with Other Countries/Regions

2.5.1.1 Annual Release of Dioxins/Furans

In 2003, the estimated annual release of dioxins/furans to the environment of Hong Kong via all vectors was 20.3 g TEQ. A comparison of the local annual dioxin/furan emission with those of Asian regions, Canada, the US and Australia on a “per capital” basis was made. Among the five Asian countries participated in the Asian UNEP toolkit project, Hong Kong’s total annual dioxin/furan release per capita was similar to that of Jordan, Lebanon, the Philippines and Vietnam, but significantly lower than that of Brunei. On a vector basis, Hong Kong’s annual air dioxin/furan emission per capita was ranked the 2nd lowest, at least 1 or 2 orders of magnitude lower than those of Australia, Canada, the US, Japan and the above Asian countries except Vietnam. The local annual water and residues dioxin/furan releases per capita were generally comparable to the range reported in most countries under comparison.

2.5.1.2 Contamination Levels of POPs in Environmental Media and Marine Biota

The contamination levels of POPs in local environmental media (ambient air, marine water, marine sediment and marine fish and shellfish) were found to be generally comparable to the range reported in other urban locations around the world.

2.5.1.2.1 Ambient Air

Overall, ambient air dioxin concentration of 0.06 pg I-TEQ/m³ measured in Hong Kong for the period 2000-04 was comparable with the range reported in most other urban locations in Europe, the US and Australia, and fell at the lower end of that reported for Japan and Korea.

2.5.1.2.2 Marine Water and Sediment

The calculated mean (lower bound) dioxin/furan concentration of 0.55 pg I-TEQ/L fell at the high end of the range (0.24-0.40 pg TEQ/L) reported in public waters of Japan in 1998-2000. Few other marine water dioxin/furan data from elsewhere were available for comparison. All other 10 Convention POPs were found to be below detection limit in the local marine water.

Comparison of the levels of marine sediment POPs contamination in Hong Kong and other countries/regions was made based on best available data. Overall, the levels of POPs in local marine surface sediment were comparable with those reported in other locations around the world. Of the POPs pesticides compared, local sediment DDT contamination appeared to be lower than that in the California coast while dieldrin contamination was slightly higher than the levels found in Tampa Bay (the US), Pearl River Estuary (of the Mainland), Argentina and Columbia. For sediment PCB and dioxin/furan contamination, mean local levels fell at the lower end of the range reported in New York Harbour (PCBs and dioxins/furans), Californian and Dutch coast (PCBs), and Swedish coast (dioxins/furans).

2.5.1.2.3 Marine Fish and Shellfish

Similarly, levels of POPs contamination in marine fish and shellfish of Hong Kong were compared with those reported by other countries/regions. The levels of POPs in local marine fish and shellfish were generally comparable with those reported in other locations around the world. HCB in local marine fish appeared to be higher than the extremely low range reported in all other locations. Fish DDT level in Hong Kong was similar to the level found in the Mediterranean, the Japanese Sea and the Mainland coast, but slightly higher than the range reported in South East Asia locations. DDT level in local shellfish was comparable to the level recorded in Japan, Singapore, Korea and some South East Asia countries, and at the lower end of the range recorded for the Mainland and Vietnam. The mean concentrations of PCBs in both marine fish and shellfish of Hong Kong were similar to those found in Japan, Singapore, Korea and Australia and at the lower end of the range reported in the Mediterranean. The dioxin/furan level in marine fish was at par with that detected in the European coast, Baltic Sea, San Francisco Bay and Tokyo Bay, and at the lower end of the range reported in Southern Norway, North Sea and New York Harbour.

2.5.1.2.4 Contamination Levels of POPs in Human Breast Milk

The mean breast milk concentration of DDT in Hong Kong mothers was 2.68 µg/g lipid wt which was the highest level reported in the 16 countries/regions participated in the exercise, and that of indicator PCBs was 0.04 µg/g lipid wt which ranked the 8th lowest among 26 participating countries/regions worldwide. The mean human breast milk concentrations of dioxin-like PCBs and dioxins/furans were 4.67 and 8.25 pg TEQ/g lipid wt, respectively, which ranked 10th and 13th lowest, respectively, among the 26 countries/regions that participated in the 3rd Round WHO/EURO Exposure Study.

2.5.2 Ecological Risk Assessment

Assessment based on available data indicated that overall, there was unlikely to be any unacceptable ecological risk of toxicological significance associated with exposure of local

marine life to the current level of POPs contamination in the marine environment of Hong Kong.

2.5.2.1 Risk Assessment of POPs to Pelagic Organisms

A two-tiered approach to ecological risk assessment of POPs to local pelagic organisms (excluding cetaceans) at the population level was adopted. Tier 1 calculated the Hazard Quotients (HQ) of POPs by comparing their concentrations detected in local marine water with relevant chronic toxicity values. POPs with a HQ >1 were identified as chemicals of potential toxicological concern subject to further, in-depth Tier 2 Probabilistic Risk Assessment (PRA) using the procedures outlined in Solomon and Takacs (2002).

The calculated HQs for POPs, except DDT, were all below unity, indicating that there was no unacceptable risk of toxicological significance associated with exposure of local pelagic organisms (not including cetaceans) to these POPs. DDT was subject to further evaluation by the Tier 2 PRA. The PRA results indicated that the lower 5th centile of estimated chronic toxicity distribution was not exceeded by the upper 5th centile of exposure distribution, suggesting there was no significant ecological risk elicited by exposure of local pelagic organisms (not including cetaceans) to DDT.

Ecological risk assessment of POPs (chlordane, DDT, dieldrin, heptachlor, HCB, toxaphene and PCBs) to local cetaceans had previously been conducted in two consultancy studies, adopting an individual-based approach and methodology based on the Guidelines for Ecological Risk Assessment (USEPA, 1998) and using toxicity values derived from terrestrial mammalian studies as surrogates. Assessment results indicated that there was no unacceptable risk of toxicological significance associated with exposure of local dolphins to the current levels of POPs contamination of the marine environment.

2.5.2.2 Risk Assessment of POPs to Benthic Organisms

The ecological risk to local benthic organisms from potential exposure to POPs through direct contact with marine sediment was also assessed. Local sediment concentrations of POPs were evaluated against the published international Sediment Quality Criteria/Guidelines. Mean contamination levels of POPs in the marine sediment of Hong Kong generally fell at the lower end of the range of screening concentrations published in the Sediment Quality Criteria/Guidelines of USEPA, Canada and Australia/New Zealand, suggesting there would be little risk of toxicological significance associated with exposure of local benthic organisms to POPs.

2.5.3 Health Risk Assessment

Results of the health risk assessment indicated there was no unacceptable risk of toxicological significance associated with inhalation and dietary exposure of the Hong Kong population to the current level of POPs contamination in the local environment and food items.

2.5.3.1 Estimate of Daily Total Exposure to Dioxins/Furans

The measured mean ambient air concentration of dioxins/furans in Hong Kong (2003) was 0.06 pg I-TEQ/m³. Assuming a respiratory rate of 20/min and a tidal volume of 600 ml, the daily intake of dioxins/furans by local residents via the inhalation route was estimated to be 0.017 pg TEQ/kg bw/day (calculated based on body weight of 60 kg for an average adult). The estimate of dietary exposure of the local population to dioxins/furans (2003) was 0.91 pg TEQ/kg bw/day. Therefore, total daily exposure of local residents to dioxins/furans was estimated to be 0.927 pg TEQ/kg bw/day (assuming negligible intake via the drinking water route). This value fell at the lower end of the range (1-4 pg TEQ/kg bw/day) of Tolerable Daily Intake of dioxins/furans set by WHO (1998). Dietary exposure was the major route, accounting for 98.2% of total exposure to dioxins/furans, while inhalation exposure accounted for only 1.8%. The finding was in good agreement with internationally reported data.

2.5.3.2 Human Non-Carcinogenic Risk Assessment on POPs

The potential for non-carcinogenic health effects associated with exposure to POPs contamination of the local ambient air and locally consumed food items was evaluated by calculating the Hazard Quotient (HQ) which was defined as the ratio of the estimated lifetime average daily dose (LADD) of POPs from dietary (Table 7) and inhalation (Table 5) pathways to the Reference Dose (RfD) (USEPA) or Acceptable Daily Intake (ADI) (WHO). Exposure levels below the RfD or ADI would be considered unlikely to elicit adverse health effects. The calculated HQs of all 12 Convention POPs were well below unity, indicating there was no unacceptable non-carcinogenic risk of toxicological significance associated with a lifetime exposure of local residents to current levels of POPs contamination in the local ambient air and locally consumed foods.

2.5.3.3 Human Carcinogenic Risk Assessment on POPs

2.5.3.3.1 Inhalation Carcinogenic Risk Assessment

Japan has established an ambient air quality standard of 0.6 pg TEQ/m³ for the sum of dioxins/furans and dioxin-like PCBs. The concentration guidelines for dioxins in ambient air set by various government agencies elsewhere in the world range from 0.02 to 40 pg I-TEQ/m³. The HKSARG has not set ambient air quality standard for dioxins/furans. The mean dioxin/furan concentration of 0.06 pg I-TEQ/m³ measured in local ambient air (2003) fell at the lower end of the range published in overseas national guidelines and significantly lower than that of Japan.

Inhalation cancer risk of POPs to the local residents was estimated based on the measured ambient air POPs concentrations (for 2000-04) and using unit risk factors published in the USEPA Scorecard and IRIS database. Excess lifetime cancer risk in the range of 1×10^{-4} to 1×10^{-6} was considered acceptable for regulatory purposes in protecting human health (USEPA).

The estimated inhalation cancer risks of POPs (including DDT, heptachlor, HCB, PCBs and dioxins/furans) all fell at the lower end of the 1×10^{-4} to 1×10^{-6} range, indicating there was no unacceptable inhalation cancer risk of toxicological significance to the Hong Kong population.

2.5.3.3.2 Dietary Carcinogenic Risk Assessment

The potential for carcinogenic health effects associated with exposure to POPs contamination of the locally consumed food items was calculated by multiplying the LADD of chemical exposure from consumption of local food items by its carcinogenic slope factor. Excess lifetime cancer risk in the range of 1×10^{-4} to 1×10^{-6} was considered acceptable for regulatory purposes in protecting human health (USEPA). The calculated dietary cancer risks of POPs (DDT, HCB, PCBs and dioxins/furans) all fell well within the 1×10^{-4} to 1×10^{-6} range, indicating there was no unacceptable dietary cancer risk of toxicological concern associated with a lifetime exposure of local residents to current levels of POPs contamination in the locally consumed foods.

2.5.3.4 Levels of POPs Contamination in Local Marine Biota

In the absence of Food Safety Standards on POPs in Hong Kong, the levels of POPs contamination in marine fish and shellfish sampled in the local waters were examined against published national and overseas Food Safety Standards/Action Levels. The levels of POPs in local marine fish and shellfish were well below the standards/action levels set by the Mainland, the US and the EC.

2.5.3.5 Human Incremental Risk Assessment on POPs in Local Marine Environment

2.5.3.5.1 Incremental Non-Carcinogenic Risk Assessment

The potential for incremental non-carcinogenic health effects associated with exposure to POPs contamination in the local marine environment was evaluated by calculating the HQ which was defined as the ratio of the LADD from consumption of locally-caught seafood and incidental ingestion of marine water (during recreational activities) to the RfD (USEPA) or ADI (WHO). Exposure levels below the RfD or ADI would be considered unlikely to elicit adverse health effects. The calculated HQs for all 12 Convention POPs were well below unity, indicating there was no unacceptable incremental non-carcinogenic risk of toxicological concern associated with a lifetime exposure of Hong Kong residents to current levels of POPs contamination in locally caught marine fish and shellfish. It should be noted, however, that exposure to POPs from sources other than locally caught seafoods (and incidental ingestion of seawater during recreational activities) had not been taken into account in the incremental risk assessment.

2.5.3.5.2 Incremental Carcinogenic Risk Assessment

The potential for incremental carcinogenic health effects associated with exposure to POPs contamination in the local marine environment was calculated by multiplying the LADD of chemical exposure from consumption of locally-caught seafood and incidental ingestion of marine water (during recreational activities) by its carcinogenic slope factor. Excess lifetime

cancer risk in the range of 1×10^{-4} to 1×10^{-6} was considered acceptable for regulatory purposes in protecting human health (USEPA). The calculated cancer risks of POPs all fell well within the 1×10^{-4} to 1×10^{-6} range, indicating there was no unacceptable incremental cancer risk of toxicological concern associated with a lifetime exposure of Hong Kong residents to current levels of POPs contamination in locally caught marine fish and shellfish.

3. STRATEGIES, PRIORITIES AND ACTION PLANS OF THE HKSAR IMPLEMENTATION PLAN

3.1 POPs Management Framework and Implementation Strategy

- Develop an integrated and transparent legislative framework and institutional system to effectively control, minimize and prevent the potentially adverse impact of POPs on human health and the environment.
- Uphold the principle of environmental sustainability in pursuing community development, and apply best available techniques (BAT) / best environmental practices (BEP) to reduce environmental pollution by POPs.
- Conduct a structured monitoring programme to better characterize and quantify the local POPs emission profile which is vital to the planning and development of a practical and successful action plan to reduce or ultimately eliminate POPs.

3.2 Overall Assessment of Current POPs Pollution in Hong Kong

- On a “per capita” basis, the current (2003) annual dioxin/furan release in Hong Kong was generally similar to those of Asian regions, Canada, the US and Australia, and was the 2nd lowest in air emission.
- The level of POPs contamination in the local environment (ambient air, marine water, marine sediment, marine fish and shellfish) was generally comparable to the range reported in most other urban locations in Asia Pacific, Europe, the US and Australia.
- Assessment based on available data indicated that overall, there was unlikely to be any unacceptable ecological risk of toxicological significance associated with exposure of local marine life to the current level of POPs contamination in the marine environment of Hong Kong.
- Total daily exposure of local residents to dioxins/furans was estimated to be 0.927 pg TEQ/kg bw/day, a value falling at the lower end of WHO’s Tolerable Daily Intake of 1-4 pg TEQ/kg bw/day. Dietary intake was the major route, accounting for 98.2% of total exposure of local residents to dioxins/furans.
- Results of human health risk assessment indicated that there was no unacceptable inhalation nor dietary chronic/carcinogenic risk of toxicological concern associated with a lifetime exposure of Hong Kong residents to current levels of POPs contamination in the

local environment and locally consumed foods.

- Levels of POPs in local marine biota were found to be well below national and overseas Food Safety Standards/Action Levels of the Mainland, the US and the EC.

3.3 Action Plans

3.3.1 Strengthening of the Institutional and Regulatory Systems

A summary of identified legislative gaps and proposed action items to meet the Stockholm Convention requirements is presented in Action Plan 1.

Action Plan 1 Legislative Framework for POPs Management and Control

Action Item	Anticipated Outcome	Responsible Party	Priority/Target Term
POPs Pesticides			
To consider a review of the overall pesticide control system in Hong Kong.	Ensure full compliance of the requirements under the Stockholm Convention on control of POPs pesticides.	AFCD	High/Short-term (<5 yr)
Non-Pesticide POPs			
To enact new legislation to regulate the import, export, manufacture and use of non-pesticide hazardous chemicals in Hong Kong.	Have in place legislation enacted specifically for regulating the import, export, manufacture and use of non-pesticide hazardous chemicals in Hong Kong.	EPD	High/Short-term (<5 yr)

3.3.2 Validation and Refinement of the POPs Inventories

The compilation of a robust and reliable POPs inventory is vital to the planning and development of practical and relevant action plans to effectively reduce and ultimately eliminate POPs in Hong Kong. Action Plan 2 summarizes the list of proposed action items to fill critical data gaps identified in the current POPs inventories, including the dioxin/furan source inventory, environmental levels of POPs contamination, dietary exposure to POPs and human body burden of POPs.

Action Plan 2 Validation and Refinement of the POPs Inventories

Action Item	Anticipated Outcome	Responsible Party	Priority/ Target Term
Source Inventories on POPs - Release of Unintentional POPs as by-Products			
To establish a more representative local annual activity and emission level of the “aluminium production” process.	Better assessment of the industry performance and its contribution to local annual dioxin/furan emission profile.	EPD	High/ Short-term (<5 yr)
To further analyze sewage effluent and sewage sludge at source.	Achieving better estimate of local annual dioxin/furan release from sewage and sludge disposal.	EPD	High/ Short-term (<5 yr)
To collate information on local annual stormwater production and analyze the stormwater for level of dioxin/furan contamination.	Assessment of the contribution of stormwater discharge to local annual dioxin/furan emission profile.	EPD	Medium/ Med - term (5-10 yr)
To analyze local livestock waste composting and establish a local dioxin/furan emission factor specific to the trade.	Better estimate of local annual dioxin/furan emission from the livestock waste composting activity.	EPD	High/ Short-term (<5 yr)
To further study the composition and fate of boiler ash residues generated from coal fired power boilers plants.	Characterization of this potential emission source “in residue” and “in product”, and better assessment of its contribution to the local dioxin/furan emission profile.	EPD	High/ Short-term (<5 yr)
Environmental Levels of POPs - POPs in Local Environmental Media and Aquatic Biota			
To include all 12 Convention POPs in the routine monitoring programme for local ambient air.	Improved environmental POPs inventory for the effectiveness evaluation of the HKSARIP.	EPD	High/ Short-term (<5 yr)
To include all 12 Convention POPs (dioxins/furans in particular) in the routine monitoring programme for local marine water, sediment and biota.	Improved environmental POPs inventory for the effectiveness evaluation of the HKSARIP.	EPD	High/ Short-term (<5 yr)
To conduct further studies of POPs in local water birds on a project basis, with possible collaboration with local academia.	Improved environmental POPs inventory for the effectiveness evaluation of the HKSARIP.	AFCD	High/ Short-term (<5 yr)
To conduct further studies of POPs in local marine mammals on a project basis whenever opportunities arise, with possible collaboration with local academia.	Improved environmental POPs inventory for the effectiveness evaluation of the HKSARIP.	AFCD	High/ Short-term (<5 yr)

Action Item	Anticipated Outcome	Responsible Party	Priority/ Target Term
To monitor the level of POPs contamination in local inland water and river sediment on a project basis.	Improved environmental POPs inventory for the effectiveness evaluation of the HKSARIP.	EPD	Medium/ Med-term (5-10 yr)
To monitor the level of POPs contamination in local surface soil and vegetation on a project basis, with possible collaboration with local academia.	Improved environmental POPs inventory for the effectiveness evaluation of the HKSARIP.	EPD	Low/ Long-term (>10 yr)
Dietary Exposure to POPs – POPs Contamination in Locally Consumed Foods and Drinking Water, Food Consumption Patterns and Food Safety Standards/Action Levels			
To include all 12 Convention POPs for analysis in all main locally consumed food groups in the routine food surveillance programme.	Improved dietary POPs inventory for better assessment of the local situation	FEHD	High/ Short-term (<5 yr)
To consider including all 12 Convention POPs in the routine drinking water surveillance programme.	Improved dietary POPs inventory for better dietary risk assessment and the effectiveness evaluation of the HKSARIP.	WSD	High/ Short-term (<5 yr)
A population-based local food consumption survey commissioned by FEHD; To conduct Total Diet Studies in the future when additional resources are made available.	Better estimate of dietary exposure of local residents to POPs.	FEHD	Medium - High/ Short - Med-term (<5 -10 yr)
To consider setting Food Safety Action Levels on POPs specific to Hong Kong by taking reference from national and international food safety authorities.	Effective control and management of POPs contamination of locally consumed foods.	FEHD	Medium/ Med-term (5 - 10 yr)
Human Body Burden of POPs - Human Breast Milk and Blood/Serum			
To participate in the 4 th and subsequent WHO-Coordinated Survey of Human Milk for the 12 Convention POPs, with possible collaboration with local academia.	Improved human body burden POPs inventory for better health risk assessment and the effectiveness evaluation of the HKSARIP.	DH	High/ Short-term (<5 yr)
To consider, taking into account international best practices, initiating measurements of POPs in the blood/serum of local residents on a project basis, with possible collaboration with local academia.	Improved human body burden POPs inventory for better health risk assessment and the effectiveness evaluation of the HKSARIP.	DH	Medium/ Med-term (5 - 10 yr)

3.3.3 Measures to Reduce Emission of Unintentionally Produced POPs

Article 5 of the Stockholm Convention calls for Parties to take measures to reduce the production and release of unintentionally produced POPs, i.e., dioxins/furans, and for BAT/BEP to be

applied for new sources in the source categories identified in Part II of Annex C. In the HKSAR, all Annex C, Part II source categories identified, including incinerators (crematoria and chemical waste incineration works), aluminium (secondary) works and power plants, are Specified Processes subject to licensing control under the Air Pollution Control (Specified Processes) Regulations (SP Regs). Operators are required to implement best practicable means (BPM) to control and minimize air emission from their operations. The BPM set out minimum technical requirements for plant/process designs, work practices and emission standards. To ensure that the emission requirements are in line with the latest best international practice, the BPM will be reviewed from time to time and revised, as required, taking into consideration relevant international BAT/BEP guidelines including those of the Stockholm Convention on POPs. Any new development of the above source categories is also subject to a rigorous environmental impact assessment process under the EIAO.

Proposed measures to reduce emissions of unintentionally produced POPs, i.e. dioxins/furans, are summarized in Action Plan 3. These measures are being pursued as part of the HKSARG's environmental portfolio in accordance with the established timetable.

Action Plan 3 Measures to Reduce Emission of Unintentionally Produced POPs

Action Item	Anticipated Outcome	Responsible Party	Target Term
Emission of Dioxins/Furans to Air			
To optimize the use of existing generating capacity of gas-fired power plants and to progressively phase out old coal-fired generation units and replace with gas-fired plants, subject to energy policy, economic considerations and technical feasibility, and timing of adjusting the fuel mix to meet the local power demand.	Reduced dioxin/furan emission to the local atmosphere.	EPD	Short to Long-term (<5 - >10 yr)
To tighten dioxin emission standards for crematoria under best practicable means and progressively phase out or replace old cremation units.	Reduced dioxin/furan emission to the local atmosphere.	EPD	Short to Medium-term (<5 – 10 yr)
To introduce more stringent motor vehicle emission standards.	Reduced emission of respirable suspended particulate (RSP) and nitrogen oxide (NO _x), and the associated vehicular dioxins/furans to the local atmosphere.	EPD	Short-term (<5 yr)
Emission of Dioxins/Furans to the Marine Environment			

Action Item	Anticipated Outcome	Responsible Party	Target Term
To implement a territory-wide sewage improvement programme, including the Harbour Area Treatment Scheme Stage 2A and upgrading of sewage treatment works, subject to the acceptance by the community of the need for the full recurrent costs to be recovered through the sewage services charging scheme.	Reduced dioxin/furan release to the local marine environment from sewage effluent discharge.	EPD	Short to Medium-term (<5 – 10 yr)
Integrated Environmental Waste Management			
To implement integrated waste management in a sustainable and environmentally sound manner, including waste prevention and recycling as top priority and adoption of BAT and BEP to treat clinical waste, sewage sludge and unavoidable municipal solid waste, subject to the implementation of the “polluter-pays” principle.	Reduced overall local annual dioxin/furan emission via all vectors.	EPD	Short to Medium-term (<5 – 10 yr)

3.3.4 Public Awareness Campaign

A summary of the proposed action items to raise local public awareness of POPs-related issues is presented in Action Plan 4.

Action Plan 4 Public Awareness Campaign

Action Item	Anticipated Outcome	Responsible Party	Target Term
To develop a dedicated POPs thematic website under EPD’s website.	Effective dissemination of science-based facts on POPs and POPs-related issues to the public, and enhanced local community participation in the global effort to reduce and eliminate POPs in the environment.	EPD	Short-term (<5 yr)
To produce POPs information pamphlets for distribution to the public, and to design exhibition panels for display in EPD’s Environment Resource Centres and other appropriate venues.	Effective dissemination of science-based facts on POPs and POPs-related issues to the public, and enhanced local community participation in the global effort to reduce and eliminate POPs in the environment.	EPD	Short-term (<5 yr)

Action Item	Anticipated Outcome	Responsible Party	Target Term
To organize publicity events, education/training programmes and visits to various target groups (school students, professionals, NGOs and the public at large) on POPs-related themes and topics.	Effective dissemination of science-based facts on POPs and POPs-related issues to the public, and enhanced local community participation in the global effort to reduce and eliminate POPs in the environment.	EPD	Short-term (<5 yr)

3.3.5 Regional Collaboration with the Mainland

Hong Kong is geographically located at the Pearl River Estuary. Sound and effective environmental management of environmental pollution of POPs must encompass the PRD Region as a whole. Action Plan 5 presents the proposed action items for strengthening regional collaboration with the Mainland especially the PRD.

Action Plan 5 Regional Collaboration with the Mainland

Action Item	Anticipated Outcome	Responsible Party	Target Term
To organize regional technical workshops and training seminars on POPs monitoring and analytical protocols, and risk assessment methodologies.	Enhanced information exchange and knowledge sharing, harmonization of POPs monitoring approaches, and improved data comparability within the region.	EPD	Short-term (<5 yr)
To conduct joint regional POPs monitoring programme on a project basis.	Contribution to the development of a regional overall picture of POPs and to the effective control and environmental management of POPs in the PRD.	EPD	Medium-term (5 - 10 yr)

3.3.6 Capacity Building

To achieve the objectives of the HKSARIP, the following capacities would need to be built up and/or strengthened within the HKSAR. The proposed action items are summarized in Action Plan 6.

Action Plan 6 Capacity Building

Action Item	Responsible Party	Target Term
--------------------	--------------------------	--------------------

Action Item	Responsible Party	Target Term
To improve legislative and management systems for comprehensive and effective POPs control in Hong Kong.	EPD	Short-term (<5 yr)
To promote BAT/BEP in local community activities, industrial processes and public utilities.	EPD	Short to Long-term (<5 - >10 yr)
To enhance local POPs monitoring and analytical capabilities, in close collaboration with the local academia and commercial laboratories.	EPD	Short to Long-term (<5 - >10 yr)
To update the POPs database and refine the POPs inventories.	EPD	Short-term (<5 yr)

3.3.7 Implementation Plan Review and Effectiveness Evaluation

Articles 15 and 16 of the Stockholm Convention call for periodic progress/effectiveness review of a National Implementation Plan and reporting to the Conference of the Parties. The HKSARIP has included action plans to control/restrict the import, export, manufacture and use of the intentionally produced POPs, to reduce dioxin/furan emission, and to improve local and regional control and management of POPs. The effectiveness of implementing these action plans will be evaluated based on the annual records of local import/export/manufacture/use activities, reports of routine monitoring and *ad hoc* studies of POPs in the local environment and foods, and human body exposure. The data generated will be used to update and refine the HKSAR's POPs inventories which are instrumental to a science-based re-assessment of our local POPs situation prior to the next review year. The HKSARIP will be reviewed and the POPs inventories updated at periodic intervals as determined by the CPG in accordance with the decisions of the Conference of the Parties to the Stockholm Convention. The HKSAR Report, which includes the updated POPs Inventories and the HKSARIP Effectiveness Review, will form part of the PRC's National Report to be provided to the Conference of the Parties in the review year.

– END –

Annex 1 Development of the HKSAR Implementation Plan

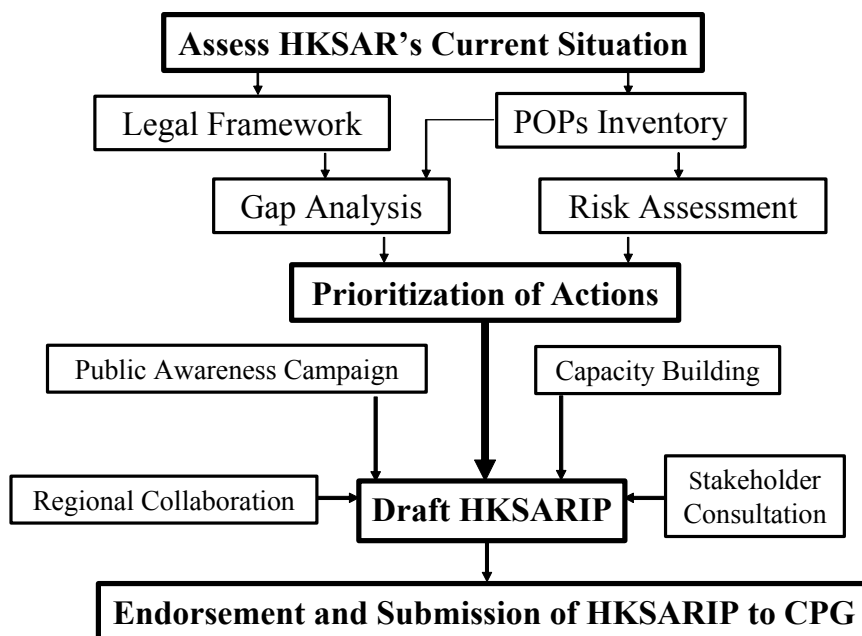
1. The POPs Unit in EPD

The Persistent Organic Pollutants (POPs) Unit of the EPD is responsible for preparing the HKSAR Implementation Plan (HKSARIP), working on new legislation to control non-pesticide hazardous chemicals, and coordinating matters relating to the implementation of the Stockholm Convention in the HKSAR.

Staff composition of the POPs Unit:

Leader	Dr. Stephanie W.Y. MA
Members	Dr. Rong YANG
	Ms. Queenie Y.C. NG
	Ms. Stella L.S. LEE (technical support)
	Mr. Anthony H.M. CHAN (technical support)

2. Preparation of the HKSAR Implementation Plan



Annex 2 Development of the HKSAR POPs Inventory

1. Methodology

1.1 Data Sources

In developing this inventory report, existing information was gathered from all available sources to represent the broadest possible sweep of relevant local data. The main sources of information were annual government reports of routine monitoring programmes, relevant reports of *ad hoc* and case studies and government-funded consultancy studies. Study reports generated by local academia and relevant publications in the open literature were also critically reviewed for their suitability to be included in the inventory. The work of several local universities contributed significantly, especially to the sections on environmental levels and human exposure to POPs. The lists of Government departments and local universities that contributed to the POPs inventory are shown in Sections 3 and 4, respectively.

1.2 Data Gathering and Reporting

The inventory framework was developed in accordance with relevant UNEP guidance documents, a list of which is presented in Section 5. The framework set out the format of primary information retrieval and recording in order to maximize data consistency and compatibility. A “multi-level”, bottom-up approach was adopted:

- *Level 3* – Entries of original data retrieved from individual reports/studies;
- *Level 2* – Summaries of collated data based on the POPs inventory emission subcategories and individual classes of activities; and
- *Level 1* – An overall summary of data compiled in accordance with the POPs inventory emission categories, environmental compartments and exposure media.

The manufacture, use and stockpile inventory of pesticides was reported for a 5-year period (2000-2004) for which data were available. The dioxin emission inventory and dietary exposure were compiled for the year 2003, the most recent year of complete data entries. For information on POPs in the local environment, all relevant environmental data generated from studies reported in the recent 5 years (2000-2004) were included in this inventory.

1.3 Data Screening and QA/QC Procedures

Data screening and quality assurance check was conducted at initial information retrieval and reporting (*Level 3*) in accordance with the framework set out in the EPD POPs Inventory Team Internal Guidance Notes. For emission data, production/activity levels were verified against different information sources including annual records, self-monitoring reports and *ad hoc* study reports. To ensure compatibility of data, screening criteria for environmental data included number of samples, sampling methodology, analytical method, detection limit and unit of

reporting. All data entries were cross-checked during subsequent data compilation (*Levels 2 and 1*).

1.4 Analysis of Data Uncertainties

This inventory was compiled based on existing information from relevant Government departments and from open literature review. There was inadequate documentation of local industrial/commercial/urban activities and/or limited analytical data on the level of POPs contamination in some classes of emission sources. The inventory for POPs in some environmental media was compiled based on data reported from a single study and/or limited sampling sites and/or limited samples. There was a general lack of local food consumption data on the population level and data on the contamination level of POPs in some locally consumed food groups were limited. These were identified as data gaps and highlighted in the inventory report.

2. **The HKSARG POPs Inventory Team**

Team Leader:	Ping Hon LUI
Coordinator:	Stephanie W. Y. MA
Air Media:	Peter K. K. LOUIE Billy K. H. CHEUNG
Water Media:	Cathie S. W. KUEH Rong YANG
Waste Media:	Wilkie W. H. LEUNG Kam Lun LO

3. **List of Contributing Government Departments**

- The Agriculture, Fisheries and Conservation Department
- The Census and Statistics Department
- The Civil Engineering & Development Department
- The Customs and Excise Department
- The Department of Health
- The Drainage Services Department
- The Environmental Protection Department
- The Fire Services Department
- The Food and Environmental Hygiene Department
- The Trade and Industry Department

4. **The List of Contributing Local Universities**

- City University of Hong Kong / Centre for Coastal Pollution and Conservation
- Hong Kong Baptist University / Croucher Institute for Environmental Sciences
- The University of Hong Kong
- Chinese University of Hong Kong
- Hong Kong University of Science and Technology

5. References

5.1 List of Key UNEP Guidance Documents

- UNEP Interim Guidance for Developing a National Implementation Plan for the Stockholm Convention (Revised, December 2004).
- UNEP-GEF: 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 (UNEP Chemicals, September 2000).
- UNEP Guidelines for the Identification of PCBs and Materials Containing PCBs (UNEP Chemicals, August 1999).
- UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases (UNEP Chemicals, May 2003).
- UNEP Asia Toolkit Project on Inventories of Dioxin and Furan Releases - National PCDD/PCDF Inventories (UNEP Chemicals, July 2003).

5.2 Literature Cited

Atkins China Ltd., 2000. Central Reclamation Phase III, Design and Construction for the Minimum Option – Final Sediment Quality Report.

Australian National Dioxins Program, 2004. Dioxins in Australia - A Summary of the Findings of Studies Conducted from 2001 to 2004. A consultancy funded by the Australian Government, Department of the Environment and Heritage.

Australian National Dioxins Program, 2004. Inventory of Dioxin Emissions in Australia, Technical Report No. 3. A consultancy funded by the Australian Government, Department of the Environment and Heritage.

Australian National Dioxins Program, 2004. Dioxins in Aquatic Environments in Australia, Technical Report No. 6. A consultancy funded by the Australian Government, Department of the Environment and Heritage.

CDM, 2003. Environmental and Engineering Feasibility Assessment Studies (EEFS) in

Relation to the Way Forward of the HATS.

CEDD, 2005. Environmental Monitoring and Audit for Contaminated Mud Pit IV at East of Sha Chau (2000-2005). Agreement No. CE 64/99, Agreement No. CE 64/99, Civil Engineering and Development Department, Hong Kong SAR Government.

CH2M-IDC Hong Kong Limited, 2003. A Study of Toxic Substances Pollution in Hong Kong. Agreement No. CE 22/99 (EP).

CityU Professional Services Limited, 2001. Analysis of Tissue Contaminant Levels for Selected Fauna in the Intertidal Mudflat of the Mai Po Inner Deep Bay Ramsar Site. Agreement No. AFD/SQ/92/00, Final Report submitted to Agriculture, Fisheries and Conservation Department, Hong Kong SAR Government.

CityU Professional Services Limited, 2003. Development of a Biological Indicator System for Monitoring Marine Pollution. Agreement No. CE2/2001 (EP).

Connell, D.W., Fung, C.N., Minh, T.B., Tanabe, S., Lam, P.K.S., Wong, B.S.F., Lam, M.H.W., Wong, L.C., Wu, R.S.S. and Richardson, B.J., 2003. Risk to breeding success of fish-eating Ardeids due to persistent organic contaminants in Hong Kong: evidence from organochlorine compounds in eggs. *Water Res.* **37**: 459-467.

CSD, 2004. Thematic Household Survey Report, No.16. Census & Statistics Department, Hong Kong SAR Government.

EPD, 2001. Demolition of Kwai Chung Incineration Plant. Agreement No. CE 15/99, Environmental Protection Department, Hong Kong SAR Government.

EPD, 2001. Demolition of Kenny Town Comprehensive Development Area. Agreement No. CE 15/99, Environmental Protection Department, Hong Kong SAR Government.

EPD, 2002. Decommissioning of Cheoy Lee Shipyard at Penny's Bay. Agreement No. CE 68/99, Environmental Protection Department, Hong Kong SAR Government.

EPD, 2002. Polychlorinated Biphenyls (PCBs) Survey in 2001/02. Internal Technical Paper, EPD/ITP 35/02, Environmental Protection Department, Hong Kong SAR Government.

EPD, 2003. A Study of Toxic Substances Pollution in Hong Kong. Agreement No. CE 22/99, Environmental Protection Department, Hong Kong SAR Government.

EPD, 2003. Baseline Surveys on Trace Toxics in Hong Kong Marine Biota. Environmental Protection Department, Hong Kong SAR Government.

EPD, 2004. Marine Water Quality in 2003. Environmental Protection Department, Hong Kong SAR Government.

EPD, 2004. Performance Test Report for Treatment of Indirect Thermal Desorption Residues at the Chemical Waste Treatment Centre. Environmental Protection Department, Hong Kong SAR Government.

EPD, 2004. Demolition and Decontamination Works at the Kwai Chung Incineration Plant. Agreement No. CE 85/2001, Environmental Protection Department, Hong Kong SAR Government.

EPD, 2004. Demolition and Decontamination Works at the Proposed Kenny Town Comprehensive Development Area Site. Agreement No. CE 85/2001, Environmental Protection Department, Hong Kong SAR Government.

EPD, 2005. Marine Water Quality in 2004. Environmental Protection Department, Hong Kong SAR Government.

EPD, 2005. Monitoring of Toxic Substances in the Hong Kong Marine Environment in 2004. Environmental Protection Department, Hong Kong SAR Government.

ERM Hong Kong, Limited, 2004. Infrastructure for Penny's Bay Development. Contract 2 - Monthly EM & A Reports.

FEHD, 2002. Dietary Exposure to Dioxins of Secondary School Students. Food and Environmental Hygiene Department, Hong Kong SAR Government.

FEHD, 2003. A Routine Food Surveillance Programme. Food and Environmental Hygiene Department, HKSAR Government.

Fu, J.M., Mai, B.X., Sheng, G.Y., Zhang, G., Wang, X.M., Peng, P.A., Xiao, X.M., Ran, R., Cheng, F.Z., Peng, X.Z., Wang, Z.S. and Tang, U.W., 2003. Persistent organic pollutants in environment of the Pearl River Delta, China: an overview. *Chemosphere* **52**: 1411-1422.

Hartwell, S. I., 2004. Distribution of DDT in sediments off the central California coast. *Mar. Pollut. Bull.* **49**: 299– 305.

Hedley, A.J., Wong, T.W., Nelson, E.A.S. and Hui, C.L.L., 2004. Human Dioxin Levels in Hong Kong – A Pilot Study. ECF Grant No. 8/2000, Final Report.

Imanishi, K., Kawakami, M., Shimada, A., Chikaishi, K., Kimura, Y., Kajiwara, N., Yamada, T. and Tanabe, S., 2004. Detection of pesticides unregistered in Japan, toxaphene and mirex, in the cetaceans from Japanese coastal waters. *Organohalogen Compd.* **66**: 1527-1532.

Information Services Department, HKSAR Government, Publications and Press Releases. <http://sc.info.gov.hk/gb/www.isd.gov.hk/eng/prelease.htm>.

Jefferson, T.A., Curry, B.E. and Kinoshita, R., 2002. Mortality and morbidity of Hong Kong finless porpoises, with emphasis on the role of environmental contaminants. *Raffles Bull. Zool., Suppl.* **10**:161-171.

Kong, K.Y., 2004. Risk Assessment of Organochlorine Pesticides and Polycyclic Aromatic Hydrocarbons in Fish Collected from Fish Ponds in the Pearl River Delta. M.Phil. Thesis, The Hong Kong Baptist University, 172 pp.

Lam, P.K.S. and Lam, M.H.W., 2004. Assessment of Risks to the Mai Po/Inner Deep Bay Ramsar Site due to Environmental Contaminants. *In: Developments in Ecosystems, Vol.1, ed. M.H. Wong.* pp. 115-129. Elsevier B.V.

Liu, J.H. and Kueh, C.S.W., 2005. Biomonitoring of heavy metals and trace organics using the intertidal mussel *Perna viridis* in Hong Kong coastal waters. *Mar. Pollut. Bull.* **51**: 857-875.

Louie, P.K.K. and Sin, D.W.M., 2003. A preliminary investigation of persistent organic pollutants in ambient air in Hong Kong. *Chemosphere* **52**:1397-1403.

Maunsell Environmental Management Consultants Ltd., 2000. Wan Chai Development Phase II EIA Report.

Maunsell Environmental Management Consultants Ltd., 2003. Penny's Bay Reclamation Stage 1 - Final EM&A Summary Report (May 2003), 21 and 23 June 2000 (before dredging).

Müller, J.F., Gaus, C., Prange, J.A., Pöpke, O., Poon, K.F., Lam, M.H.W. and Lam, P.K.S., 2002. Polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans in sediments from Hong Kong. *Mar. Pollut. Bull.* **45**:372-378.

Nanjing Institute of Soil Sciences, Chinese Academy of Sciences, PRC and Hong Kong Baptist University, HK SAR, 2004. Research on Soil Environment of Hong Kong. 225 pp.

New Zealand Inventory of Dioxin Emissions to Air, Land and Water and Reservoir Sources, 2000. Ministry for the Environment, ISBN 0 478 09074 9.

Ove Arup & Partners Hong Kong Ltd., 2001. Comprehensive Feasibility Study for the Revised Scheme of South East Kowloon Development.

Planning Development, 1999. Sustainable Development for the 21st Century: Environmental Baseline Survey on Toxics in Marine Sediment and Biota. Planning Department, Hong Kong SAR Government.

Shaw, B.J., 1995. Evaluation of Risks to Human Health in Hong Kong from Consumption of Chemically Contaminated Seafood: A Risk Assessment Approach. M.Sc. Thesis, The

University of Hong Kong, 118 pp.

Sin, D.W.M., Choi, J.Y.Y. and Louie, P.K.K., 2002. A study of polychlorinated dibenzo-*p*-dioxins and dibenzofurans in the atmosphere of Hong Kong. *Chemosphere* **47**:647-653.

So, M.K., Zhang, X., Giesy, J.P., Fung, C.N., Fong, H.W., Zheng, J. and Kramer, M.J., 2005. Organochlorines and dioxin-like compounds in green-lipped mussels *Perna viridis* from Hong Kong mariculture zones. *Mar. Pollut. Bull.* **51**: 677-687.

Soechitram, S.D., Chan, S.M., Nelson, E.A.S., Brouwers, A. and Sauer, P.J.J., 2003. Comparison of dioxin and PCB concentrations in human breast milk samples from Hong Kong and the Netherlands. *Food Addit. Contam.* **20**: 65-69.

Tam, N.F.Y. and Yao, M.W.Y., 2002. Concentration of PCBs in coastal mangrove sediments of Hong Kong. *Mar. Pollut. Bull.* **44**:642-651.

TRC Environmental Corporation, 2004. Emission Test Reports for Tuen Mun Hospital, Yan Chai Hospital, Kwai Chung Crematorium, Cape Collinson Crematorium, Diamond Hill Crematorium, Wo Hop Shek Crematorium, Lamma Power Station and Castle Peak Power Station.

UNEP/GEF, 2002. Regionally Based Assessment of Persistent Toxic Substances, Central and North East Asia Regional Report, December 2002.

UNEP/GEF, 2003. Regionally Based Assessment of Persistent Toxic Substances, Global Report, December 2003.

WHO, 1997. Guidelines for Predicting Dietary Intake of Pesticide Residues. Prepared by the Global Environment Monitoring System – Food Contamination Monitoring and Assessment Programme (GEMS/Food) in collaboration with Codex Committee on Pesticide Residues.

WHO, 2003. Global Environment Monitoring System - Food Contamination Monitoring and Assessment Programme (GEMS/Food).

Wong, C.K.C., Leung, K.M., Poon, B.H.T., Lan, C.Y. and Wong, M.H., 2002. Organochlorine hydrocarbons in human breast milk collected in Hong Kong and Guangzhou. *Arch. Environ. Contam. Toxicol.* **43**:364-372.

Wong, C.K.C., Yeung, H.Y., Woo, P.S. and Wong, M.H., 2001. Specific expression of cytochrome P4501A1 gene in gill, intestine and liver of tilapia exposed to coastal sediments. *Aquat. Toxicol.* **54**:69-80.

Wong, H.L., Giesy, J.P., Siu, W.H.L. and Lam, P.K.S., 2005. Estrogenic and dioxin-like

activities and cytotoxicity of sediments and biota from Hong Kong mudflats. Arch. Environ. Contam. Toxicol. **48**: 575-586.

World Economic Forum's Global Competitiveness Report, 2004-2005.

Yuan, D.X., Yang, D.N., Wade, T.L. and Qian, Y.R., 2001. Status of persistent organic pollutants in the sediment from several estuaries in China. Environ. Pollut. **114**: 101-111.

Zheng, G.J., Lam, M.H.W., Lam, P.K.S., Richardson, B.J., Man, B.K.W. and Li, A.M.Y., 2000. Concentrations of persistent organic pollutants in surface sediments of the mudflat and mangroves at Mai Po Marshes Nature Reserve, Hong Kong. Mar. Pollut. Bull. **40**:1210-1214.

Zhou, H.Y., Cheung, R.Y.H. and Wong, M.H., 1999. Residues of organochlorines in sediments and tilapia collected from inland water systems of Hong Kong. Arch. Environ. Contam. Toxicol. **36**:424-431.

Industrial Chemicals in the HKSAR

I. Objectives

The Stockholm Convention became effective to the People's Republic of China (PRC) (including the HKSAR) on November 11, 2004. The HKSAR needs to develop a HKSAR Implementation Plan (HKSARIP) which will form part of the PRC's National Implementation Plan (NIP) to be submitted to the Conference of the Parties of the Convention before November 11, 2006.

The Environmental Protection Department (EPD) conducted a questionnaire survey in December 2004 to collate information on the import, export, domestic production and use of the non-pesticide industrial chemicals subject to the Stockholm Convention / Rotterdam Convention for the period 1999–2003. All relevant local trade organizations and stakeholders were included in the survey. The survey also sought views of the stakeholders on potential impacts on their trade should the import, export, domestic production or use of these Convention non-pesticide industrial chemicals be restricted or prohibited. A total of 12 Stockholm Convention/Rotterdam Convention non-pesticide industrial chemicals were included in the survey (see Appendix A for the chemical list).

II. Survey Methodology

A questionnaire survey by post was employed. In December 2004, a bilingual survey questionnaire was sent to a total of 191 stakeholders under 16 groups of relevant trade and business organizations and professional bodies with follow-up telephone calls. The list of stakeholders surveyed is presented in Appendix B and a set of sample survey questionnaire is shown in Appendix C.

III. Survey Feedback on Non-pesticide Industrial Chemicals Subject to Stockholm Convention

The survey was completed in mid March 2005. Of the 191 survey questionnaires sent, a total of 82 responses were received, representing a return rate of 42.4%. Of the 82 responses received, 76 (94%) provided a 'nil' response to the survey questions indicating they had no import, export, domestic production nor use of the 12 Convention non-pesticide industrial chemicals in Hong Kong during the period 1999-2003. They also had no specific comment on the potential impact on their trade if import, export, domestic production or use of the chemicals were to be restricted or prohibited. A summary of the survey responses is shown in Appendix D and the survey feedback details are provided in Appendix E.

For the two Stockholm Convention chemicals surveyed (polychlorinated biphenyls and hexachlorobenzene), one feedback on PCBs was received from the public utility services. The company indicated that PCBs might still be used in some of its small-size capacitors (i.e., without specific non-PCB label), but these in-service capacitors are progressively being replaced by “non-PCB” ones over the years. The company also considered that there would not be any impact on the trade if the import, export, domestic production or use of PCBs were to be restricted or prohibited.

List of Non-pesticide Industrial Chemicals Surveyed

1. Polychlorinated biphenyls (PCB)*
2. Hexachlorobenzene (HCB) (CAS No.: 118-74-1)*
3. Asbestos -
 - (a) actinolite (CAS No.: 77536-66-4);
 - (b) anthophyllite (CAS No.: 77536-67-5);
 - (c) amosite (CAS No.: 12172-73-5);
 - (d) crocidolite (CAS No.: 12001-28-4); and
 - (e) tremolite (CAS No.: 77536-68-6).
4. Polybrominated biphenyls (PBB)
5. Polychlorinated terphenyls (PCT) (CAS No.: 61788-33-8)
6. Tetraethyl lead (CAS No.: 78-00-2)
7. Tetramethyl lead (CAS No.: 75-74-1)
8. Tris (2,3 dibromopropyl) phosphate (CAS No.: 126-72-7)

NOTE:

- * Non-pesticide industrial chemicals subject to the Stockholm Convention

List of Stakeholders Consulted

(1) Apparel, Accessories and Textile Made-Up Articles

The Federation of Hong Kong Garment Manufacturers
The Hong Kong & Kowloon European Dress Merchants Association
Hong Kong Apparel Society Ltd.
The Hong Kong Cotton Made-up Goods Manufacturers Association Ltd.
Hong Kong Embroidery Merchants Association Ltd.
Hong Kong Fur Federation
Hong Kong Garment Manufacturers Association Ltd.
The Hong Kong General Chamber of Textiles Limited
Hong Kong Hat Manufacturers Association Limited
Hong Kong Institution of Textile and Apparel
Hong Kong Knitwear Exporters and Manufacturers Association
Hong Kong Woollen & Synthetic Knitting Manufacturers' Association Limited

(2) Chemical, Pharmaceutical & Petroleum Products

Association of International Chemical Manufacturers
Chemical & Pharmaceutical Industries Council
Chinese Medicine Merchants Association Ltd.
The Cosmetic & Perfumery Association of HK Ltd.
Hong Kong & Kowloon Chinese Medicine Merchants Association Limited
The Hong Kong Association of the Pharmaceutical Industry
Hong Kong Dyestuffs Merchants Association Limited
Hong Kong General Chamber of Pharmacy Limited
The Hong Kong Medicine Dealers' Guild
Hong Kong Petroleum, Chemicals & Pharmaceutical Materials Merchants Association Limited
The Hong Kong Pharmaceutical Manufacturers Association Ltd. (香港製藥商會有限公司)
Hong Kong Yee Yee Tong Chinese Medicine Merchants Association Ltd.
The Industrial Chemical Merchants' Association Ltd.
Modernized Chinese Medicine International Association
Po Sau Tong Ginseng & Antler Association Hong Kong Limited (香港參茸藥材寶壽堂商會有限公司)

3) Electrical/Electronic Products and Related Services (Electronics & Telecommunication Equipment included)

The Hong Kong & Kowloon Electric Trade Association

Hong Kong & Kowloon Electrical Appliances Merchants Association Ltd.
Hong Kong & Kowloon Electro-plating Trade Merchants Association Ltd.
Hong Kong & Kowloon Machinery & Instrument Merchants Association Ltd.
The Hong Kong E & M Contractors' Association Ltd.
Hong Kong Electrical Appliances Manufacturers Association
Hong Kong Electrical Contractors' Association Ltd.
Hong Kong Electronics Industry Council
The Hong Kong Electronic Industries Association Ltd.
Hong Kong Printed Circuit Association
Hong Kong Wireless Technology Industry Association Ltd.
Optical Disc Manufacturing and Technologies Association Limited

(4) Import and Export Trade

The Hong Kong Chinese Importers' & Exporters' Association
The Hong Kong Exporters' Association
Hong Kong Industrial Production Trading Association Ltd.
The Hong Kong Shippers' Council
Po Yick General Chinese and Foreign Goods Import and Export Commercial Society of Hong Kong
The Wah On Exporters & Importers Association
The World Chinese Traders General Association (Hong Kong) Ltd.

(5) Government Funded/Statutory Organizations

Clothing Industry Training Authority
Federation of Hong Kong Industries

(6) Leather, Hides and Leather Products

The Hong Kong Hide & Leather Traders' Association Ltd.

(7) Plastics

The Chiu Chau Plastic Manufacturers Association Co., Ltd.
Hong Kong & Kowloon Plastic Products Merchants United Association Ltd.
Hong Kong & Kowloon Rubber Tyres Commercial General Association Limited
Hong Kong Auto Parts Industry Association
Hong Kong Critical Components Manufacturers Association
Hong Kong Plastic Bags Manufacturers' Association
Hong Kong Plastic Material Suppliers Association Limited
Hong Kong Plastics Industry Council
Hong Kong Plastics Manufacturers Association Ltd.
Plastic Technology Centre

(8) Spinning, Weaving and Finishing

The Federation of Hong Kong Cotton Weavers
The Hong Kong Association of Textile Bleachers, Dyers, Printers and Finishers Ltd.
Hong Kong Chinese Textile Mills Association
The Hong Kong Cotton Spinners Association
The Hong Kong General Chamber of Textiles Limited
The Hong Kong Piece-Goods Merchants' Association
Hong Kong Printers & Dyers Association Ltd.
The Hong Kong Weaving Mills Association
Textile Council of Hong Kong Ltd.
Victoria Cotton Yarn and Piece Goods Merchants Association Ltd.

(9) Paper and Packaging Products

Chinese Paper Merchants Association
Hongkong & Kowloon Machine Made Paper Merchants Association Ltd.
The Hong Kong Corrugated Paper Manufacturers' Association Ltd.
The Hong Kong Packaging Institute Ltd.

(10) Machinery

Federation of Hong Kong Machinery and Metal Industries
The Hong Kong & Kowloon Engineering Employers Association Ltd.
Hong Kong & Kowloon Machinery & Instrument Merchants Association Ltd.
Hong Kong Apleichau Machinery Traders Association
Hong Kong Plastic Machinery Association Ltd.
Hong Kong Sewing Machine Association Ltd.
Japan Machinery Centre for Trade and Investment, H.K. Office

(11) Metals

Federation of Hong Kong Machinery and Metal Industries
Hong Kong Auto Parts Industry Association
Hong Kong Diecasting Association Limited
Hong Kong Foundry Association
Hong Kong Jewellery Industry Technology Centre
Hong Kong Metal Finishing Society
Hong Kong Metal Merchants Association
The Hong Kong Metals Manufacturers Association
Hong Kong Mould & Die Council

(12) Petroleum Industry Automotive Fuel Steering Committee

China Resources Petroleum Co. Ltd. (華潤石化(集團)有限公司)
Caltex Oil Hong Kong Limited
Shell Hong Kong Limited
ExxonMobil Hong Kong Limited
Chinaoil (Hong Kong) Corporation Limited (中國石油(香港)有限公司)
Sinopec (Hong Kong) Limited (中石化(香港)有限公司)

(13) Utility Services

China Light and Power (CLP)
Hong Kong Electric Co Limited
Towngas

(14) Trade Associations including those involving Asbestos Products

Environmental Contractors Management Association
Swire SITA Waste Service Ltd
Hong Kong & Kowloon Electric Trade Association
Hong Kong & Kowloon Footwear Manufacturers Association
Hong Kong & Kowloon Motor Boats & Tug Boats Association Ltd.
Hong Kong Association of Certification Laboratories Ltd.
Hong Kong Cargo-Vessel Traders' Association Ltd.
Hong Kong Chamber of Small and Medium Business Ltd
Hong Kong Chemical Society
Hong Kong Construction Association Limited
Hong Kong Cotton Made Up Goods Manufacturers Association Limited
Hong Kong Food Council
Hong Kong General Chamber of Commerce
Hong Kong Hotels Association
Hong Kong Shipbreaking and Steel Rolling Industries Association
Hong Kong Shipowners Association Ltd.
Hong Kong Shippers' Council
Hong Kong Shipping Industry Institute
Hong Kong Vehicle Repair Merchants Associations, (香港汽車修理同業商會)
The Chinese Chamber of Commerce, Kowloon
The Chinese General Chamber of Commerce
The Chinese Manufacturers' Association of Hong Kong
The Federation of Hong Kong Hotel Owners Ltd.
The Motor Traders Association of HK, (香港汽車商會) c/o Service managers Association
(汽車維修管理協會)
The Society of Automotive Engineers – Hong Kong

The Society of Builders Hong Kong
Hong Kong Auto Parts Industry Association

香港汽車零部件工業協會

九龍中醫師公會

中國醫藥學會

全港中醫師公會聯合會

香港中成藥商會

香港中華中醫學會

香港中華製藥總商會

香港中醫師公會

香港中醫學會

香港中藥從業員協會

香港中藥聯商會

香港製藥商會

香港藥行商會

國際中醫中藥總會

港九中華藥業商會有限公司

港九中醫師公會

(15) Registered Asbestos Professionals

Mr LEGGE Michael John

Mr LEUNG James

Mr STANLEY Karl

Mr YEUNG Wai Kit Anthony

Mr CHUI Joi Fuk Markus,

Amertrack Environmental Testing Limited

Mr CHAN Wai Kwan Eric,

Architectural Services Department

Mr LAU Cheung Chee,

Architectural Services Department

Mr LOONG Koon Man,

Architectural Services Department

Mr CHAN Yu Wah, ASPEC (HK) Limited

Mr YARNALL Lee Hatherley, ASPEC (HK) Limited

Mr CHIU Byron Collin, Atkins China Ltd

Mr RIDLEY Robert Benjamin, BMT Asia Pacific Limited

Mr LEE Kin Sing, CH2M-IDC Hong Kong Limited

Ms CHAN Wing Yan Vivian, CH2M-IDC Hong Kong Limited
Dr CHAN Hon Fai, Cinotech Consultants Limited
Mr CHAN Ping Chiu, CLP Power Hong Kong Limited
Dr GREEN David William John, David Green Limited
Mr BLAIR David Hugh, Envex (H.K.) Limited
Mr LARGE Andrew John, Envex (HK) Limited
Mr LEE Chung Tang Peter,
Environmental Management Limited
Mr McLAREN-PEARSON James Malcolm, ERM-Hong Kong Limited
Mr TSE Chi Hin, Gammon Construction Limited
Mr CHENG Sing Hymn Simeon,
Kowloon-Canton Railway Corporation
Mr CHAN Pui Yan Brien,
Marsh Risk Consulting Marsh (Hong Kong) Limited
Mr LAM Wing Hong William,
Mass Transit Railway Corporation
Mr TAM Kwok Sun,
Mass Transit Railway Corporation
Mr LEUNG Man Wai Donney,
MateriaLab Consultants Limited
Mr POON Tim Leung, MateriaLab Consultants Limited
Mr TAM Wing Chuen Andy,
MateriaLab Consultants Limited
Mr KAM Chung Hau Brian,
Maunsell Environmental Management Consultants Limited
Mr LAW Cheuk Ho Jackel,
Maunsell Environmental Management Consultants Limited
Mr JACKSON Paul Richard,
Mouchel Asia Limited
Mr AU Chung Cheung,
Quattros Byad Consultancy Limited
Mr WONG San, Samson Wong & Associates Property Consultancy Limited
Achieve Construction & Engineering Co Limited
Advance Asbestos Abatement Services Limited
Asbestos Removal Contractors (HK) Company Limited
CBM Asbestos Abatement Limited
Expert-Organize Company Limited
Fineness Goal Limited
General Central Engineering Limited
Poweroad Limited, (Returned mail because outdated mailing address)
Sublett & Associates (HK) Limited
Teemway Engineering Limited
ETS Test Consult Limited
Fugro Technical Services Limited MateriaLab Division
Stanger Asia Limited

(16) Fibre Cement Materials (including asbestos and related materials)

Wah Loong Metals & Building Materials Limited
Wan Kau Kwong Kee Construction Materials Co Ltd
China H.K. Wah Lee Limited
Hang Tak Metal Co
Winson Fashions Trading Co Ltd

Sample of Survey Form and Covering Letter

Appendix C

本署檔號
OUR REF: EP72/M4/52/1()
來函檔號
YOUR REF:
電話
TEL NO.: 2594 6428
圖文傳真 電郵
FAX NO.: 2824 9361 Email: waipun@epd.gov.hk

**Hong Kong Government
Environmental Protection Department
Branch Office**
45/F, Revenue Tower,
5 Gloucester Road,
Wan Chai, Hong Kong



環境保護署分處
香港
灣仔告士打道五號
稅務大樓四十五樓

7 December 2004

Dear Sir/Madam,

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

Two International Conventions the Stockholm Convention and the Rotterdam Convention have recently come into force with effect from 17 May 2004 and 24 February 2004 respectively. The Stockholm Convention requires the prohibition and elimination of the production and usage of certain hazardous chemicals to protect human health and the environment. The Rotterdam Convention requires adoption of the Prior Informed Consent (PIC) procedure, exporters trading certain hazardous chemicals must obtain the PIC of the relevant authorities of the importing places before proceeding with the export. In addition, a country would be required to disseminate its decision on import, export and prohibitions of these hazardous chemicals to other party countries when joining the Convention.

China already ratified the Stockholm Convention on 13 August 2004, and the Convention has become effective for China, including the Hong Kong SAR, from 11 November 2004. China signed the Rotterdam Convention in August 1999 and is likely to ratify the Convention soon.

We would like to seek your views and advice before working out the details about the implementation of the Conventions in Hong Kong. In particular, we would like to know whether and to what extent the two Conventions might affect your trade if Hong Kong is to restrict or prohibit importing/exporting the hazardous industrial chemicals regulated by the Conventions as shown in the attachment. To help us understand the import/export, production and use of these chemicals in Hong Kong, I should be grateful if you would provide us with the following information and complete the form attached to this letter:

- (1) Does your trade use any of the chemicals in the list?
- (2) What is the chemical used for?
- (3) The approximate cost of the chemicals.
- (4) The amount your trade imports/exports or produces each year between 1999 and 2003.
- (5) Any effect to your trade if the import/export, production or use of the chemicals is restricted or prohibited in Hong Kong.

In addition to the list of hazardous chemicals in the attachment, there are a number of hazardous pesticides and pesticide formulations included in the Conventions. These will be dealt with separately by the Agriculture, Fishery and Conservation Department.

Please be assured that the information collected by this survey will only be used for considering implementation of the Conventions, it will be treated confidentially. I would be grateful if you could complete the attached form and return it to me before **15 January 2005 (Saturday)** using the envelope provided. In case you wish to have more details on the two Conventions, you may visit the official websites of the Rotterdam Convention at <http://www.pic.int/> or the Stockholm Convention at <http://www.pops.int/>. You may also contact me at Tel:2594 6428, Fax:2824 9361 or email me at waipun@epd.gov.hk if you wish to know more about this survey.

Yours faithfully,

(W M Pun)

for Director of Environmental Protection

Attachment

本署檔號
OUR REF: EP72/M4/52/1()
來函檔號
YOUR REF:
電話
TEL NO.: 2594 6428
圖文傳真 電郵
FAX NO.: 2824 9361 Email: waipun@epd.gov.hk

Hong Kong Government
Environmental Protection Department
Branch Office
45/F, Revenue Tower,
5 Gloucester Road,
Wan Chai, Hong Kong



環境保護署分處

香港
灣仔告士打道五號
稅務大樓四十五樓

執事先生/女士：

就《鹿特丹公約》和《斯德哥爾摩公約》涵蓋的非除害劑化學品進行調查

最近有兩條有關危險化學品的國際公約：《斯德哥爾摩公約》和《鹿特丹公約》，分別於二零零四年五月十七日和二零零四年二月二十四日生效。《斯德哥爾摩公約》規定禁止和取締某些危險化學品的生產和使用，以保護人類的健康及環境。《鹿特丹公約》則規定進出口須採用事先知情同意程序，即在進行某些危險化學品的出口前，必須得到進口地區主管當局的事先知情及同意。另外，各國在加入公約時，必須通知其他公約國其對有關化學品的進出口及取締方面所採取的措施。

中國於二零零四年八月十三日參與了《斯德哥爾摩公約》，該公約並於二零零四年十一月十一日起在中國(包括香港特別行政區)生效。至於《鹿特丹公約》，中央政府已於一九九九年八月簽署該公約，相信不久將會批准生效。

我們在制訂上述公約在本港實施的細節之前，希望先徵詢貴會的意見，特別是如果香港限制或禁止進出口上述公約所列的危險工業化學品(載於附件)，對所屬行業是否有影響及其影響的程度。為了能進一步了解該類化學品在本港的進出口、生產及使用情況，敬請貴會填妥隨信付上的表格，以提供下述資料：

- (1) 貴行業有否使用附件所列的化學品？
- (2) 有關化學品作什麼用途？
- (3) 有關化學品的大約價值。
- (4) 一九九九至二零零三年間，貴行業每年進口/ 出口或生產有關化學品的數量。
- (5) 如果香港限制或禁止有關化學品的進出口、生產或使用，對貴行業有否影響？

除了附件所列的工業化學品外，公約還包括多種危險除害劑及除害劑配方。該類除害劑及除害劑配方，會由漁農自然護理署另外處理。

本署對調查所蒐集的資料將會保密處理，並且只是提供實施公約方面的參考，敬請放心。

煩請填妥調查表格及利用付上的回郵信封，於二零零五年一月十五日(星期六)之前將表格寄回本署，多謝合作。如貴會欲了解公約的詳細內容，可瀏覽公約的官方網站<http://www.pic.int/>(《鹿特丹公約》)或<http://www.pops.int/>(《斯德哥爾摩公約》)。此外，如對本調查有任何查詢，請聯絡本署的潘偉明先生(電話：2594 6428, 傳真：2824 9361；電郵：waipun@epd.gov.hk)。

環境保護署署長

(潘偉明  代行)

二零零四年十二月七日

附件



Environmental Protection Department
Survey on Non-pesticide Chemicals included in the Rotterdam
and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

EPD reference: EP72/M4/52/1 ()

Name of Association : _____

(機構名稱) : _____

Address (地址): _____

Name of Contact person (聯絡人): _____ Title (e.g. Chairman) (職銜 例如：主席): _____

Telephone (電話號碼) : _____ Fax (傳真號碼) : _____

Email address (電郵地址): _____ Date (日期): _____



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

Notes to the survey form 調查表格註釋：

1. Please fill the form in either English or Chinese. 請用中文或英文填寫問卷。
2. Please delete options as appropriate and use 'NA' for any item which is not applicable. 請將不適用的選項刪去及在不適用的欄內填上'NA'。
3. Trade names are used for some of the chemicals under survey. We have listed the common 'example trade names' in the footnote of each of the chemical for your easy reference. 有些調查所涵蓋的化學品有常用的商品名稱，我們特別提供每個化學品常見的'商品名稱例子'以提供參考。

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
1.	Polybrominated	Yes/No (有/沒有)	Yes/No (有/沒有)		1999		



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
		If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
Biphenyls (PBB) * 多溴聯苯		Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		2000		
				2001		
				2002		
				2003		

* *Example trade names 商品名稱例子* : Firemaster BP-6, Firemaster FF-1, Hexabromobiphenyl, Bromkal 80, Flammex B-10, HFO 101, Adine 0102, hbb, obb, BB-8, Berkflam B10



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
2.	Polychlorinated Biphenyls (PCB) * 多氯聯苯	Yes/No (有/沒有)	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify)		2000		
			原料/中介物/溶劑/製成品 /其他(請註明)		2001		
					2002		
					2003		

* *Example trade names* 商品名稱例子：Aroclor, Chlorextol, Chlorinated biphenyl, Chlorinated diphenyl, Clophen, Chlorobiphenyl, Dykanol, Fenclor, Inerteen, Kanechlor, Noflamol, Phenoclor, Polychlorobiphenyl, Pyralene, Pyranol, Santotherm, Sovol, Therminol.



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
3.	Polychlorinated Terphenyls (PCT) * 多氯三聯苯	<u>Yes/No (有/沒有)</u>	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify)		2000		
			原料/中介物/溶劑/製成品 /其他(請註明)		2001		
					2002		
					2003		

* Example trade names 商品名稱例子：PCT, Aroclor (series 54), Kanechlor C, Electrophenyl T-60, Clophen Harz (W), Cloresil (A,B,100), Leromoll, Phenoclor.



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
4.	Tris(2,3 dibromopropyl) phosphate * 三(2,3-二溴丙磷 酸酯)磷酸鹽	Yes/No (有/沒有)	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify)		2000		
			原料/中介物/溶劑/製成品 /其他(請註明)		2001		
					2002		
					2003		

* *Example trade names* 商品名稱例子：Anfram 3PB, Apex 462-5, Bromkal P 67-6HP, ES 685, Firemaster LV-T 23P, Firemaster T23, Firemaster T23 P,



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

Firemaster T23P-LV, Flacavon R, Flamex T 23P, Flammex AP, Flammex LV-T 23P, Flammex T 23P, Fyrol HB32, phosphoric acid, tris(2,3-dibromopropyl)ester, T23P, Tris, tris-BP, tris(dibromopropyl)phosphate, USAF DO-41, Zetofex.

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品?	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品? (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有, 作什麼用途?(例: 原料)		Year 年份	Import 入口	Export 出口
5.	Hexachloro- benzene * 六氯代苯	<u>Yes/No (有/沒有)</u>	<u>Yes/No (有/沒有)</u>		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify)		2000		
			原料/中介物/溶劑/製成品 /其他(請註明)		2001		
					2002		
					2003		



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

* *Example trade names 商品名稱例子*: Anti-Carie, Ceku C.B., Hexachlorobenzol, Hexachlorobenzene, HCB, Perchlorobenzene, No Bunt., Bent-cure, Be, Bent-no-more.

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品?	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品? (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有, 作什麼用途?(例: 原料)		Year 年份	Import 入口	Export 出口
6.	Tetramethyl lead* 四甲基鉛	<u>Yes/No (有/沒有)</u>	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify)		2000		
			原料/中介物/溶劑/製成品 /其他(請註明)		2001		
					2002		



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
					2003		

* Example trade names 商品名稱例子：Not available

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
7.	Tetraethyl lead* 四乙基鉛	Yes/No (有/沒有)	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/		2000		



Environmental Protection Department
Survey on Non-pesticide Chemicals included in the Rotterdam
and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
 涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
			end product/others (please specify)		2001		
			原料/中介物/溶劑/製成品 /其他(請註明)		2002		
			2003				

* *Example trade names* 商品名稱例子：Not available

	Chemical and its other names 化學品及它其他 的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
8.	Crocidolite * 青石棉 Other name: Blue asbestos	<u>Yes/No (有/沒有)</u>	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		2000		
					2001		
					2002		
					2003		

* *Example trade names* 商品名稱例子：Amorphous crocidolite asbestos, asbestos, blue asbestos, fibrous crocidolite asbestos, krokydolith, NCI C09007, riebeckite asbestos.



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
9.	Amosite * 鐵石棉 Other name: Brown asbestos Mysorite.	<u>Yes/No (有/沒有)</u>	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify)		2000		
			原料/中介物/溶劑/製成品 /其他(請註明)		2001		
					2002		
					2003		

* Example trade names 商品名稱例子：Not available



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
10.	Anthophyllite * 直閃石 Other name: Anthophyllite asbestos, Azbolen asbestos.	<u>Yes/No (有/沒有)</u>	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		2000		
					2001		
					2002		
					2003		

* Example trade names 商品名稱例子：Not available



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
11.	Actinolite * 陽起石 Other name: Actinolite asbestos.	<u>Yes/No (有/沒有)</u>	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify)		2000		
			原料/中介物/溶劑/製成品 /其他(請註明)		2001		
					2002		
					2003		

* Example trade names 商品名稱例子：Not available



Environmental Protection Department

Survey on Non-pesticide Chemicals included in the Rotterdam and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

	Chemical and its other names 化學品及它其他的名稱	Does your trade produce the chemical locally? 貴行業是否在本 地生產此化學 品？	Is the chemical used in your trade (Yes/No)? 貴行業有否使用此化學品？ (有/沒有)	Approximate cost (HK\$/tonne) 大約價值 (港元/公噸)	Import and Export (tonne/yr) 出入口 (公噸/年)		
			If yes, how? (e.g. as raw material) 若有，作什麼用途？(例：原料)		Year 年份	Import 入口	Export 出口
12.	Tremolite * 透閃石 Other name: Tremolite asbestos.	<u>Yes/No (有/沒有)</u>	Yes/No (有/沒有)		1999		
			Raw-material/intermediate/solvent/ end product/others (please specify)		2000		
			原料/中介物/溶劑/製成品 /其他(請註明)		2001		
					2002		
					2003		

* Example trade names 商品名稱例子：Not available



Environmental Protection Department
Survey on Non-pesticide Chemicals included in the Rotterdam
and Stockholm Conventions

環境保護署就《鹿特丹公約》和《斯德哥爾摩公約》
涵蓋的非除害劑化學品進行調查

Please advise us in the space below on the impact to your trade if the import/export of any of the above chemical is restricted or prohibited.
請在以下空白地方，說明如限制或禁止以上各化學品的進出口對貴行業的影響。

e.g. Chemical 化學品 –

Impact 影響 –

Appendix D

Summary of Survey Responses

	Trade Organization Group	Survey Forms		Reply with 'nil return' to 'production', 'use', 'cost (HK\$/tonne)', and 'I/E'	Reply with feedback to 'use' or with 'comment'*	Reply Percentage (%)
		Form Issued	Reply Received			
1	Apparel, Accessories and Textile Made-up Articles	12	1	1	0	8.3
2	Chemical, Pharmaceutical & Petroleum Products	15	6	6	0	40
3	Electrical/Electronic Products and Related Services (including Electronics & Telecommunication Equipment)	12	4	4	1 (comment)	33.3
4	Import and Export Trade	7	1	1	1 (comment)	14.3
5	Government Funded/Statutory Organization	2	1	1	0	50
6	Leather, Hides and Leather Products	1	1	1	0	100
7	Plastics	10	1	1	0	10
8	Spinning, Weaving and Finishing	10	1	1	0	10
9	Paper and Packaging Products	4	2	2	0	50

	Trade Organization Group	Survey Forms		Reply with 'nil return' to 'production', 'use', 'cost (HK\$/tonne)', and 'I/E'	Reply with feedback to 'use' or with 'comment'*	Reply Percentage (%)
		Form Issued	Reply Received			
10	Machinery	7	2	2	0	28.6
11	Metals	9	2	2	0	22.2
12	Petroleum Industry Automotive Fuel Steering Committee	6	5	5	2 (comment)	83.3
13	Utility Services	3	3	0	3 (comment and use)	100
14	Trade Associations	41	17	16	4 (3 comments and 1 use)	42
15	Registered Asbestos Professionals	47	31	29	7 (5 comments and 2 uses)	66
16	Fibre Cement Materials	5	4	4	0	80
Total		191	82	76		42.4

Note: * Details of the survey feedback are provided in Appendix E.

Appendix E

Details of Survey Feedback

Detailed survey feedbacks were received from 6 trade organization groups and they are presented below:

(1) Electrical/Electronic Products and Related Services (including Electronics and Telecommunication Equipment)

- a) Members only import or re-export electrical appliances, not related to the chemicals involved.

(2) Import and Export Trade

- a) One out of 650 members in the export trade replied to indicate that there was no trading or production of the chemicals under survey. Majority of the members are in gifts and premium exports business and there would be very minor potential impact to their trade.

(3) Petroleum Industry Automotive Fuel Steering Committee

- a) Two members in the petroleum industry responded that there would be no impact anticipated on their operations.

(4) Utility Services

- a) One public utility company commented that PCBs might still be used in some of its small-size capacitors (i.e., without specific non-PCB labels), but these in-service capacitors are progressively being replaced by “non-PCB” ones over the years. There would not be any impact on the trade if the import, export, domestic production or use of PCBs were to be restricted or prohibited.
- b) One public utility company reported existing use of asbestos, specifically, partition boards contain 3% to 5% of Crocidolite; ceiling boards contain 5% to 10% of Crocidolite; partition boards, ceiling boards and wall seal boards all contain 15% to 20% of Amosite. There was no specific comment on the issue of potential impact on the trade if chemicals were to be restricted or prohibited.
- c) One public utility company reported existing use of asbestos, specifically, Anthophyllite and Tremolite were used as existing insulation material. There was no specific comment on the issue of potential impact on the trade if chemicals were to be restricted or prohibited, as the asbestos may be replaced by other types of insulation material.

5) Trade Associations

- a) The cargo vessel industry responded that the survey was not applicable to the trade.
- b) Three members of the construction industry responded to indicate that there had been no production or use of any of the chemicals by their trade.
- c) The shipping industry responded that their members did not produce or import any of the survey chemicals for operational processes. Their members owned/operated ships, but the ships did not consume any of the chemicals specified in the survey list. One or two of their members owned/operated chemical-tankers that called in Hong Kong, but confirmed that they did not transport any of the survey chemicals. There would be no effect on the operation of their members' business if restriction or prohibition of import or export of the listed chemicals were to be imposed.
- d) One association of the Chinese herbal medicine reported existing use of asbestos. Tremolite was used as a herb for internal preparation (‘內服藥煎劑’). A “nil” return for other questions.
[Note: Article 3 of Rotterdam Convention states that the Convention does not apply to pharmaceuticals, including human and veterinary drugs.]

6) Registered Asbestos Professionals

- a) Three Registered Asbestos Professionals reported that no impact on their trade would be expected.
- b) One Registered Asbestos Professional reported no impact on the trade, as the company for which the professional worked did not import/export any of the survey chemicals.
- c) One Registered Asbestos Professional commented that the company for which the professional worked dealt with the removal and disposal of asbestos materials, the import of most of which had already been prohibited.
- d) One Registered Asbestos Professional reported no production but existing use of all 5 types of asbestos as end product. No information on their import/export and cost was provided. There would be no impact on the trade.
- e) One asbestos testing laboratory reported existing use of all 5 asbestos, including (i) Raw materials for reference materials, (ii) Proficiency test samples for QA, and (iii) Suspected materials received from client for identification. Also reported importing activities of <0.001 t/a for the period 1999 - 2003, but no exporting activity. On cost estimate, reported no commercial value. The company indicated potential impacts of restricting/prohibiting the use of Amosite, Crocidolite, Anthophyllite, Tremolite and

Actinolite on the trade, e.g., their participation in quality assurance programme organised by overseas institutes, and their service to overseas clients in asbestos identifications.

[Note: Article 3 of the Rotterdam Convention stipulates that chemicals (including asbestos) imported for the purpose of research or laboratory analysis and in quantities not likely to affect human health are exempted.]

Annex 4 Pesticides Management and Control in the HKSAR

The Agricultural Pesticides Ordinance was enacted in 1977 to provide a statutory mechanism for the registration and trading of agricultural pesticides in the HKSAR. The scope of control was further expanded in 1991 when the Pesticides Ordinance (Cap. 133) came into effect to cover all forms of pesticides including non-agricultural pesticides and domestic ready-to-use pesticides.

Control of Pesticides in Hong Kong under the Pesticides Ordinance

Regulatory control of pesticides in Hong Kong is effected through the Pesticides Ordinance (Cap. 133) with the following major provisions:

- Registration of active ingredients and control of inert ingredients;
- Licensing of pesticide vendors, suppliers, importers and manufacturers;
- Requirement for permits to sell, supply, import, manufacture, be in possession of, and/or use unregistered pesticides; and
- Enforcing minimum requirements for labelling and bottling of pesticides.

Pesticide Registration

Only pesticides that have been registered in Hong Kong may be freely distributed and used locally. Under the Pesticides Register maintained by the Director of Agriculture, Fisheries and Conservation, details of registered pesticides (including the active ingredient(s), concentration limit and permitted formulations) are entered. Individual products do not have to be registered as long as they contain the registered active ingredient(s) and conform to the specified maximum concentration of active ingredient(s) and permitted formulation detailed in the Pesticides Register.

Pesticides are registered in one of two parts. Chemicals registered as Part I pesticides are domestic pesticides in ready-to-use formulations while those in Part II are all other (mainly agricultural and public health) pesticides.

Registration is only considered after evaluation of data submitted by the applicant on the technical active ingredients, the formulated product and the inert components. Data required include: physico-chemical properties, acute and chronic toxicological studies, fate in the environment and analytical methods. The pesticide will only be registered if the chemical is considered safe to human and the environment if used as directed by the manufacturer.

Besides controlling over active ingredients, the Pesticides Ordinance allows for the control of inert ingredients. Inert ingredients designated to be of toxicological concern will be prohibited or regulated. No person may manufacture, import, supply or retail any pesticide containing a prohibited or regulated inert ingredient unless he or she has already been granted approval.

Pesticide Licenses

To provide regulatory control within the pesticide trade, no person or company may manufacture, import, supply or retail registered pesticides unless they are in possession of a valid pesticides license. Licenses are renewable annually. Premises intended for manufacture, repackaging

and/or sale of pesticides are inspected before a license is issued or renewed to ensure they are suitable for such activities.

Under the licensing system, there are two types of license available, namely:

- A Part I license to import/repack/supply/manufacture/retail all Part I pesticides;
- A Part I/II license to import/repack/supply/manufacture/retail all registered pesticides.

Pesticide Permits

The Pesticides Ordinance allows for the import for re-export or for other purpose (e.g. reformulate, sell, use) of unregistered pesticides under a pesticides permit. Permits are issued for specific chemicals, valid for 6 months, and can be extended for further 6-month periods.

Majority of permits cover unregistered pesticides being imported for re-export. There are a number of chemicals, however, are imported under a permit for use. These are chemicals considered too dangerous to be available to the general public but are recognized as important commercial chemicals used worldwide by professional operators. These chemicals include commercial fumigants such as methyl bromide and aluminium phosphide, TBT-based anti-fouling paints and rodenticides imported by pest control companies at higher concentrations than those allowed in products for general retail sale.

In every case where a permit allows the use of unregistered pesticide, the permit holder is required to demonstrate competence in storing, handling and using the concerned pesticide before a permit is initially granted as well as before each extension is approved.

Import and Export of Pesticides

As stated above, registered pesticides may only be imported by a holder of a pesticides licence and unregistered pesticides may only be imported or possessed by a holder of a pesticides permit issued in respect of that pesticide under the Pesticides Ordinance. In addition, each shipment of registered or unregistered pesticides entering or leaving Hong Kong must also be covered by an import and/or export licenses issued under the Import and Export Ordinance (Cap. 60). All such licences, with the exception of those covering methyl bromide (an ozone-depleting substance), are issued by the Agriculture, Fisheries and Conservation Department under delegation of Authority from the Trade and Industry Department. Import and export licenses for methyl bromide are issued directly by the Trade and Industry Department.

Labeling and Bottling of Pesticides

Minimum requirements for the labelling and bottling of pesticides are prescribed in the Pesticides Regulations under the Pesticides Ordinance. Pesticides are required to be packed in a container, which is impervious and is sufficiently strong to prevent leakage. In addition, there are specific requirements on a pesticide label to ensure vital information on application and safety precautions is placed in a conspicuous position on the container in both Chinese and English. These requirements are set to safeguard pesticide users, the general public and the environment.

Storage of Pesticides

Provisions of storage requirements for pesticides are laid down under the Pesticides Regulations to ensure pesticides are stored in a safe manner. No person may store or keep any pesticides in such conditions as to be liable by spillage to contaminate any foodstuffs or to constitute a danger to the health or safety of persons.

In addition, statutory requirements under the Dangerous Goods Ordinance (Cap.295) apply to pesticides that come under the definition of “dangerous goods” and are subject to regulatory control enforced by the Fire Services Department. For aerosol pesticide products contain liquefied petroleum gas (LPG), they are also subject to regulatory control under the Gas Safety Ordinance (Cap.51) administered by the Electrical & Mechanical Services Department.

Disposal of Pesticides

The Pesticides Ordinance laid down provisions over the disposal of pesticides. The Director of Agriculture, Fisheries and Conservation may give to the license or permit holder directions for the disposal of a pesticide and for the disposal of any container containing that pesticide.

In addition, the Waste Disposal Ordinance (Cap. 354) controls the disposal of pesticide waste and used pesticide containers. Producers of such waste are required to register with the Environmental Protection Department and have to dispose of their waste in a regulated and environmentally sound manner. In effect, this amounts to consigning waste material to a licensed waste collector who transports it to licensed treatment or disposal facilities for processing. The main objective of the scheme is to ensure that chemical waste is properly managed by all parties, from the source of production to the place of final disposal.

Safe Use of Pesticides and Public Education

Pesticides should be used in a safe, efficient and effective manner where safety relates to both human and the environment. In promoting safe and proper use of pesticides, the Agriculture, Fisheries and Conservation Department has prepared and make available a series of education leaflets on related subjects including:

- Safe Use of Household Pesticides (In both Chinese and English)
- Pesticide Safety – Increase Awareness; Reduce Hazards (In both Chinese and English)
- Safe Use of Household Pesticides for Mosquito Control (In both Chinese and English)
- Use of Pesticides for Outdoor Mosquito Control (In both Chinese and English)
- Pictorial Guide on Safe Use of Agricultural Pesticides (In Chinese only)
- Safe Use of Mosquito Larvicides (In Chinese only)

These leaflets are available to the general public on the website of Agriculture, Fisheries and Conservation Department at: <http://www.afcd.gov.hk>.

Annex 5 Stakeholder Consultation Documents

I. Objectives of the Stakeholder Consultation Workshop

The Stockholm Convention became effective to the People's Republic of China (PRC) (including the HKSAR) on November 11, 2004. The HKSAR needs to develop a HKSAR Implementation Plan (HKSARIP) which will form part of the PRC's National Implementation Plan (NIP) to be submitted to the Conference of the Parties of the Convention before November 11, 2006.

Stakeholder consultation is an important process in the preparation of the HKSARIP. A stakeholder consultation workshop was therefore convened on November 18, 2005 by the HKSAR Government (HKSARG), with the Environmental Protection Department (EPD) taking the lead, to seek views from relevant stakeholders on POPs-related issues in Hong Kong.

II. The Stakeholder Consultation Workshop

A discussion paper on an overview of POPs issues in Hong Kong, environmental and health risk assessment, strategies and proposed action plan was prepared and distributed to the stakeholders in advance to facilitate their discussion at the workshop.

Stakeholder participation of the workshop is summarized in Table 1. A total of 85 stakeholders representing 78 organizations were invited (see the invitation letter in Appendix A and the stakeholder invitation list in Appendix B). A total of 54 stakeholders attended the workshop and 52 copies of the discussion paper were distributed to attendees before the workshop. The attendance list of the workshop is in Appendix C.

Table 1 Summary of Stakeholder Participation in the Workshop

	Academia	Special Interest Groups	Professional Bodies	Business Associations & Companies	Utility Services	Government Departments	Total
No. of Stakeholders Invited	12	19	9	21	5	19	85
No. of copies of Discussion Paper Distributed	11	8	3	8	3	19	52
No. of Stakeholders Attended	10	5	1	7	3	28	54
No. of Stakeholders Provided Feedback	8	2	1	1	3	See Note 1	15

Note 1: Government departments were consulted in the preparation of the discussion paper.

III. Summary of Stakeholder Feedback

The stakeholder feedback statistics are in Table 2.

Table 2 Summary of Stakeholder Feedback Statistics

Subject of Feedback	Number of Feedback					
	Academia	Special Interest Groups	Professional Bodies	Business Associations & Companies	Utility Services	Total
POPs Inventory	4	2	2	1	2	11
POPs Risk Assessment	3	0	0	0	1	4
Public Awareness	1	1	0	0	0	2
Regional Collaboration	3	0	0	0	0	3
Capacity Building	2	1	1	1	0	5
Total						25

The stakeholders commended EPD on the well-organized workshop, with particular reference to the circulation of the discussion paper to them in advance. The stakeholders appreciated the quality of EPD's work that underpinned the preparation of the discussion paper and commented that the HKSARIP would be a milestone in Hong Kong: the comprehensive science-based inventory of background levels formed a sound basis for data gap analysis and risk assessment of the current Hong Kong situation on POPs, as well as prioritization of actions to be taken for the HKSAR to meet the requirements of the Stockholm Convention.

A brief account of the stakeholders' views and the Government's responses covering four major topics of the draft HKSARIP is presented below. Details of the stakeholders' feedback at the workshop and written comments/suggestions are in Appendices D and E respectively. Snapshots of the workshop in action are in Appendix F.

1. POPs Inventory

Stakeholders' Views:

- POPs inventories in Hong Kong and the Pearl River Delta (PRD) at large are critical to the effective reduction and elimination of POPs within the region, and need to be established and/or further refined to fill the data gaps.

- Regular and periodic POPs monitoring activities are important for on-going risk assessment and action prioritization, in order to evaluate the effectiveness of the HKSARIP.
- The Government needs to conduct more robust local food surveillance and a local food consumption survey in order to perform more reliable dietary exposure risk assessment of POPs to ensure public health and safety.

Government's Responses:

- The draft HKSARIP has included action items to fill the data gaps and to achieve more accurate estimates of the release of POPs in Hong Kong.
- The Government will carry out evaluation of the effectiveness of the HKSARIP in line with the requirements specified in Article 16 of the Convention, and will focus monitoring efforts on POPs detected in the environment after an initial screening programme to cover all 12 POPs, to make best use of resources.
- The draft HKSARIP has included action items to fill the dietary exposure data gaps to ensure that food safety concerns relating to POPs are fully addressed.

2. Public Awareness

Stakeholders' Views:

- Good risk communication and a public awareness campaign are important for disseminating scientifically accurate information in layman terms to the general public in order to promote participation of the community in reducing POPs in Hong Kong.
- The Government needs to strengthen public education on POPs and make good use of the existing community publicity programmes to enhance the effectiveness of the campaign against POPs.

Government's Responses:

- EPD will launch a dedicated POPs thematic website under EPD's website, planned to be in early 2006, to disseminate accurate and science-based updated information on POPs to the local community. EPD will also organize publicity events in the coming years to promote public awareness of POPs-related issues in various target groups including school students, professionals, NGOs and the public at large.

3. Regional Collaboration

Stakeholders' Views

- The HKSAR needs to enhance regional collaboration with the Mainland counterparts, involving not only the state and regional authorities, but also the academia at large, under the umbrella of the Stockholm Convention to meet the target of reducing and ultimately eliminating POPs in the HKSAR and the PRD region as a whole.

Government's Responses:

- The draft HKSARIP has proposed action items to strengthen regional collaboration in the PRD which includes promoting the standardization of monitoring and risk assessment methodologies, enhancing information exchange and knowledge sharing, and conducting joint regional monitoring of POPs on a project basis in the medium term (5 – 10 yr). The Government appreciates and will continue to rely on support in various forms from the stakeholders, in particular the local academics, for successful implementation of the proposed actions to effectively reduce and ultimately eliminate POPs in the region.

4. Capacity Building

Stakeholders' Views:

- The HKSAR needs to strengthen local capacity building in POPs monitoring techniques and laboratory analytical capability to effectively implement the action plans in the HKSARIP to meet the Convention requirements.

Government's Responses:

- The Government fully support local research and development in POPs monitoring, testing and risk assessment methodologies, and would endeavour to promote and enhance information exchange, knowledge sharing and technology transfer among local and Mainland academia to enhance local and regional capacity building.

本署檔號
OUR REF: EP1030/C1//1 III ()
來函檔號
YOUR REF:
電話
TEL NO.: 2835 1339
圖文傳真
FAX NO.: 2574 6571
電郵
E-mail: mawystephanie@epd.gov.hk

**Hong Kong Government
Environmental Protection Department
Branch Office**
28/F, Southorn Centre,
130 Hennessy Road,
Wan Chai, Hong Kong



環境保護署分處
香港灣仔
軒尼詩道 130 號
修頓中心 28 樓

November 4, 2005

Dear Sir/Madam,

**Stakeholder Consultation Workshop on the Preparation of
the Hong Kong Implementation Plan (HKIP) for the Stockholm Convention
November 18, 2005**

The Stockholm Convention is an international treaty to protect human health and the environment from the potentially harmful persistent organic pollutants (POPs). The Convention has identified an initial set of 12 POPs for global restriction of production/use and where possible, ultimate elimination. These hazardous chemicals include 8 (+1) pesticides (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex and toxaphene), 2 industrial chemicals (hexachlorobenzene and polychlorinated biphenyls), and 2 unintentionally produced by-products (polychlorinated dibenzo-*p*-dioxins and dibenzofurans).

The Stockholm Convention became effective to the People's Republic of China (PRC) (including the HKSAR) on November 11, 2004. The HKSAR needs to develop a Hong Kong Implementation Plan (HKIP) which will form part of the PRC's National Implementation Plan (NIP) to be submitted to the Conference of the Parties of the Convention around October 2006.

The comments and suggestions of the stakeholders are important for the preparation of the draft HKIP. You are cordially invited to attend a stakeholder consultation workshop on POPs-related issues in Hong Kong. A discussion paper entitled "*Draft Hong Kong Implementation Plan – Overview of POPs Issues in Hong Kong, Environmental and Health Risk Assessment, Strategies and Proposed Action Plan*" has been prepared for the

occasion.

– 2 –

Details of the workshop are as follows:

Date: November 18, 2005 (Friday)
Time: 1000 – 1300
Venue: Leighton Hill, Community Hall, 133 Wong Nai Chung Road, Happy Valley, Hong Kong

Programme:

0940 – 1000 Registration
1000 – 1015 Opening Remarks
1015 – 1045 Presentation by EPD on the Preparation of the draft HKIP
1045 – 1245 Discussion Session
1245 – 1300 Closing Remarks

To facilitate our arrangement for the event, please kindly complete and return the attached reply form, **on or before Friday November 11, 2005**.

Should you have any enquiries, please do not hesitate to contact the undersigned.

Yours faithfully,



(Dr. Stephanie WY MA)

for Director of Environmental Protection

Enclosure – Reply Form

**Stakeholder Consultation Workshop
on the Preparation of the Hong Kong Implementation Plan (HKIP)
for the Stockholm Convention
November 18, 2005**

1. Name of the organization:

2. Please tick the following box(es) as appropriate:

- Will not attend the captioned event.
- Will attend the captioned event.
- Please send me an English version of the Discussion Paper (electronic copy).
- Please send me a Chinese version of the Discussion Paper (electronic copy).

3. Workshop attendee contact information:

Name	Title	Telephone	Fascimile	E-mail

Reply Form*

* Please kindly return the completed reply form to Dr. Ron YANG, EPD by Fax: 2574 6571 or E-mail: ryang@epd.gov.hk. Thank you.

Stakeholder Consultation Workshop Invitation List

Academia

- 1 City University of Hong Kong, Centre for Coastal Pollution & Conservation
- 2 City University of Hong Kong, Department of Biology & Chemistry
- 3 University of Hong Kong, Department of Community Medicine
- 4 University of Hong Kong, Department of Geography
- 5 Hong Kong Baptist University, Institute for Natural Resources and Environmental Management
- 6 The Open University of Hong Kong, Department of Environmental Studies
- 7 Chinese University of Hong Kong, Department of Geography & Resource Management
- 8 Chinese University of Hong Kong, Department of Community & Family Medicine
- 9 University of Science and Technology, Institute for Environment and Sustainable Development
- 10 Hong Kong Polytechnic University, Department of Civil Engineering

Special Interest Groups

- 11 Civic Exchange
- 12 Friends of the Earth
- 13 World Wide Fund for Nature Hong Kong
- 14 The Marine Biological Association of Hong Kong
- 15 Green Power
- 16 Green Peace
- 17 Green Council
- 18 Hong Kong Dolphin Watch
- 19 Produce Green Foundation
- 20 Caring for Our Community
- 21 Hong Kong Sustainable Communications Association
- 22 The Conservancy Association
- 23 Earth Care
- 24 Green Lantau Association
- 25 Green Peng Chau Association
- 26 Hong Kong Organic Farming Association
- 27 Kadoorie Farm & Botanic Garden
- 28 Promotion of Environmental Protection Awareness
- 29 The Hong Kong Bird Watching Society

Professional Bodies

- 30 Chartered Institution of Water and Environmental Management
- 31 The Hong Kong Institute of Environmental Impact Assessment
- 32 Association of Planning Consultants of Hong Kong
- 33 Institute of Biology (Hong Kong Branch)
- 34 The Hong Kong Institute of Engineers
- 35 The Law Society of Hong Kong
- 36 Ocean Park Conservation Foundation
- 37 Hong Kong Chemical Society
- 38 Air & Waste Management Association

Business Associations & Companies

- 39 The Hong Kong General Chamber of Commerce

- 40 The Chinese General Chamber of Commerce
- 41 The Chinese Manufacturer's Association of Hong Kong
- 42 The Federation of Hong Kong Industries
- 43 Business Environment Council
- 44 Hong Kong Productivity Council
- 45 Hong Kong & Kowloon Electric Trade Association
- 46 The Hong Kong Chinese Importers' & Exporters' Association
- 47 Hong Kong Association of Textile Bleachers, Dyers, Printers and Finishers
- 48 Hong Kong Association of Certification Laboratories Ltd.
- 49 Federation of Hong Kong Machinery and Metal Industries
- 50 Hong Kong & Kowloon Steel & Metal Importers & Exporters Association
- 51 China Resources Petroleum Co. Ltd.
- 52 Caltex Oil Hong Kong Ltd.
- 53 Shell Hong Kong Ltd.
- 54 ExxonMobil Hong Kong Ltd.
- 55 Chinaoil (Hong Kong) Corporation Ltd.
- 56 Sinopec (Hong Kong) Ltd.
- 57 Hong Kong Pest Management Association
- 58 Pest Control Personnel Association of Hong Kong
- 59 Environmental Contractors Management Association

Utility Services

- 60 CLP Power
- 61 Hong Kong Electric Co. Ltd.
- 62 Towngas
- 63 MTR Corporation Limited
- 64 KCR Corporation

Government Departments

- 65 Agriculture, Fisheries & Conservation Department
 - 66 Department of Health
 - 67 Drainage Services Department
 - 68 Environmental Protection Department
 - 69 Food & Environmental Hygiene Department
 - 70 Fire Services Department
 - 71 Labour Department
 - 72 Government Lab
 - 73 Trade and Industry Department
 - 74 Customs and Excise Department
 - 75 Marine Department
 - 76 Census and Statistics Department
 - 77 Civil Engineering and Development Department
 - 78 Water Supplies Department
-

Appendix C

Stakeholder Consultation Workshop Attendance List

	<u>Organization</u>	<u>No. of Stakeholders Attended</u>
Academia		
1	City University of Hong Kong, Centre for Coastal Pollution & Conservation	2
2	University of Hong Kong, Department of Community Medicine	1
3	Hong Kong Baptist University, Institute for Natural Resources and Environmental Management	4
4	Chinese University of Hong Kong, Department of Geography & Resource Management	1
5	University of Science and Technology, Institute for Environment and Sustainable Development	1
6	Hong Kong Polytechnic University, Department of Civil Engineering	1
Special Interest Groups		
7	Friends of the Earth	1
8	Green Peace	1
9	Green Council	2
10	Earth Care	1
Professional Bodies		
11	Chartered Institution of Water and Environmental Management	1
Business Associations & Companies		
12	The Hong Kong General Chamber of Commerce	1
13	The Chinese General Chamber of Commerce	1
14	The Federation of Hong Kong Industries	1
15	Hong Kong Productivity Council	2
16	Pest Control Personnel Association of Hong Kong	1
17	Environmental Contractors Management Association	1
Utility Services		
18	Hong Kong Electric Co. Ltd.	1
19	MTR Corporation Limited	2
Government Departments		
20	Agriculture, Fisheries & Conservation Department	5
21	Department of Health	1
22	Drainage Services Department	1
23	Environmental Protection Department	12
24	Food & Environmental Hygiene Department	5
25	Fire Services Department	1
26	Labour Department	3
Total:		54

Details of Stakeholders' Feedback and Government's Responses at the Workshop

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
<i>1. POPs Inventory</i>		
Academia	<ul style="list-style-type: none"> ● Congratulated EPD on the high quality work in the preparation of the discussion paper.. The HKSARIP would be a milestone in HK to provide a comprehensive sound, science-based inventory of background levels and risk assessment of the current Hong Kong situation on POPs, and prioritize actions to be taken for HK to meet the requirements of the Stockholm Convention. ● Commented that monitoring was an important tool to assess the effectiveness of the actions undertaken. There was a need to conduct POPs monitoring on a regular basis to provide data for risk assessment and prioritization actions to be carried out periodically to evaluate the effectiveness of the HKSARIP. 	<ul style="list-style-type: none"> ● EPD appreciated the stakeholders' comments and suggestions. ● EPD responded that the Convention requires Parties to evaluate the effectiveness of their implementation plans at intervals to be determined by the Conference of the Parties. Due to the high cost of POPs monitoring, the Government would consider carrying out an initial screening of all 12 POPs in various environmental media and would review the monitoring programme from time to time to focus on POPs that were detected in the environment and were assessed to be of potential concern to Hong Kong.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	<ul style="list-style-type: none"> In particular, the regular food surveillance programme conducted by the Government needed to be strengthened, covering a complete spectrum of major market food groups including local and imported food items from the Mainland to provide adequate data on all POPs. The data generated would be critical for conducting reliable dietary exposure risk assessment on local residents. 	<ul style="list-style-type: none"> EPD concurred and confirmed that the draft HKSARIP had proposed an action item to include analysis of all 12 POPs in the routine Food Surveillance Programme.
	<ul style="list-style-type: none"> The “aluminium production (secondary)” was identified as a major contributor to dioxin/furan release in the “residues”. The high productivity in the local “non-ferrous metal processing industry” would be a concern, especially if there still existed small smelters not equipped with sophisticated air pollution control systems. 	<ul style="list-style-type: none"> EPD clarified that the apparently high local annual productivity of “aluminium production (secondary)” in 2003 was a reported figure from the local industries. It was possible that a large part of this reported local production throughput was actually aluminium scraps imported for re-export to other places (e.g. the Mainland) for smelting. One action item of the draft HKSARIP was to investigate this local industrial process to validate the reported annual activity and to establish local EFs for dioxin release to residues so that a more accurate assessment of dioxin emission from this category could be done. EPD confirmed that the Government would adopt BPM in the local industry to control dioxin emission from secondary non-ferrous metal production.
	<ul style="list-style-type: none"> Noted that an earlier regional based assessment on persistent toxic substances in 2001-2003 identified some POPs of emerging concern in the Southeast Asia, e.g. PCP, methyl-mercury, PBDE, TBT, HCH and PAHs. As these chemicals were not currently covered by the Stockholm Convention, what was the position of the HKSAR Government in taking actions on these POPs candidates? 	<ul style="list-style-type: none"> EPD responded that some of the POPs identified in the regional study, e.g. PBDE, were on the list of candidates proposed by Parties in the COP-1 of the Stockholm Convention and were being considered by the POPs Review Committee. The Government would closely monitor the development and take prompt action accordingly once new POPs candidates were listed under the Convention.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
Professional Bodies	<ul style="list-style-type: none"> • Would the Government add another POPs monitoring location, apart from the 2 existing ones in Tsuen Wan and Central/Western, to reflect the ambient air quality in view of the rapid economic development in the PRD? For example, a new station at Tung Chung due to potential air quality impacts resulting from cross-boundary projects such as Hong Kong – Zhuhai – Macau Bridge & Shenzhen Western Corridor? 	<ul style="list-style-type: none"> • EPD responded that the Government did not have any plan for a third routine ambient air dioxin/PCB monitoring station in HK at this time. The stakeholder’s suggestion of adding another station at Tung Chung would be kept in view.
	<ul style="list-style-type: none"> • Requested further information on the estimate of HCB release as an unintentional by-product. 	<ul style="list-style-type: none"> • EPD explained that according to a survey conducted by EPD in early 2005, there appeared to be little domestic use of HCB as an industrial chemical in HK. Several pesticides, e.g. quintozene and chlorthal-dimethyl, which might contain HCB as impurities, were registered pesticides in HK with possible local application. However, the contribution of HCB released as a by-product due to use of these pesticides was judged to be insignificant based on the small amount of usage.
Special Interest Groups	<ul style="list-style-type: none"> • EPD was congratulated on the well organized workshop. It was particularly helpful that detailed information was sent to stakeholders beforehand to allow enough time for their perusal and comment. 	<ul style="list-style-type: none"> • EPD appreciated stakeholders’ comments and their active participation in the preparation of the draft HKSARIP.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	<ul style="list-style-type: none"> Noted that the release of dioxin to water in the disposal category consisted of emission from 3 subcategories/classes including sewage with no sludge removal, sewage with sludge removal and landfill leachate. Requested clarification as to (1) if these three categories accounted for all dioxin emission sources to water in HK; and (2) if the estimation was based on local EF or UNEP generic EF. Noted that the contribution of dioxin release from sewage with no sludge removal was much higher than sewage with sludge removal. Commented that sewage treatment upgrade projects pursued by the Government would significantly reduce dioxin release to water. 	<ul style="list-style-type: none"> EPD confirmed that the three sewage disposal categories cited were the only dioxin emission sources to the water vector in HK and that local EFs were used in their respective estimation. Concurred that sewage treatment upgrading projects such as the HATS Stage 2A would be put in place to increase the amount of sewage receiving CEPT or secondary treatment, thereby significantly reducing the dioxin emission to the environment.
	<ul style="list-style-type: none"> Noted that 0.6% dioxin release to water was estimated to have come from landfill leachate. Commented that in view of the small amount of leachate produced, the POPs contamination level might be very high in the leachate. 	<ul style="list-style-type: none"> EPD confirmed that the amount of landfill leachate production was minute compared with the volume of sewage production, and that the levels of POPs in landfill leachate were not particularly high according to existing data from the monitoring program at the landfills. That was why landfill leachate accounted for only 0.6% of total dioxin emission to water.
	<ul style="list-style-type: none"> Clarification requested on whether there would be any emission control on dioxin-like PCBs release due to incineration. 	<ul style="list-style-type: none"> EPD clarified that the current concern on POPs from combustion process was primarily focused on emission of dioxins. The UNEP toolkit did not provide EFs on dioxin-like PCBs. Should such information become available in the future, the Government would consider including dioxin-like PCBs in the local emission assessment.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	<ul style="list-style-type: none"> Clarification requested on whether a central incineration facility (CIF) being proposed would have significant contribution to dioxin release into the air. 	<ul style="list-style-type: none"> EPD clarified that the Stockholm Convention did not prohibit Contracting Parties from building new incineration facilities, although it obliged a Contracting Party to give consideration and priority to alternatives, and if alternatives are not used, to consider the prevention and release reduction measures set out in the Convention and to promote/require the use of BAT/BEP. As the issue of incineration was still being discussed in the context of the IWMF, the Government did not have any estimate on the release of dioxins at the moment.
<p>Business Associations and Companies</p>	<ul style="list-style-type: none"> Noted that the POPs in the marine and river sediments were likely to be released as a result of dredging & river training works, causing potential impacts on local seafood and water quality in general. Clarification requested on whether guidelines on marine or river training works for regulatory control purposes would be issued in connection with the HKSARIP. 	<ul style="list-style-type: none"> EPD clarified that marine dredging works under certain conditions were designated projects in HK and were currently controlled under the Environmental Impact Assessment Ordinance (EIAO). The ETWB Technical Circular (Works) No. 34/2002 on the Management of Dredged and Excavated Sediment also required a tiered assessment of the excavated sediment to determine its appropriate disposal site based on the chemical and biological testing results. The Government might consider including the 12 POPs in the tiered assessment of excavated sediment for disposal in due course, after a further review of the local situation and needs.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
Utility Services	<ul style="list-style-type: none"> DDT levels in the breast milk of HK nursing mothers were found to be the highest among the 26 countries/ regions participating in the 3rd Round WHO-coordinated Survey. Clarification requested on whether breast-feeding would cause harmful effects to babies. 	<ul style="list-style-type: none"> DH responded that whilst human breast milk might be contaminated with POPs, the benefit of breast-feeding to the development and immunity of new-born infants significantly outweighed the potential harmful effects caused by POPs contaminants. Therefore, WHO and other health authorities around the world continued to promote breast-feeding as breast milk was still considered to be the best food for babies. WHO cautioned that any study on human breast milk should cautiously state the impacts of contaminations in breast milk in order not to unduly affect mothers' decision to adopt breast feeding.
	<ul style="list-style-type: none"> Noted that EPD once carried out dioxin stack emission monitoring at one of the local power plants and dioxin emission level was below detection limit. Noted that in the discussion paper, the dioxin emission from power generation category accounted for 45.3% of total release in the air vector. Clarification requested on how the figure was estimated. 	<ul style="list-style-type: none"> EPD clarified that the dioxin emission from coal-fired power plants estimated in the POPs inventory was based on the annual activity in local power generation plants and local EFs to air which was expressed as dioxin emission per unit production/activity. The level of dioxin stack emission depended on a number of factors, such as the quality of the coal fuel, the air pollution control system and the combustion technology employed at the plant. HK's air dioxin EF for coal-fired power generation sub-category had been established in a comprehensive consultancy study of major local power plants, with data collected from systematic monitoring of emission sources at various locations in HK over a time period. The local EF was in fact substantially lower than the UNEP toolkit generic EF.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	<ul style="list-style-type: none"> Noted that one of the proposed action items was to phase-out coal-fired power generation units and replace with those using natural gas. Requested clarification on whether the phasing-out program had been agreed with the major utility service companies and whether there would be any cost implications on electricity consumers. 	<ul style="list-style-type: none"> EPD responded that the phasing-out programme was not new for the draft HKSARIP. The proposed action items would be pursued as part of the Government's environmental portfolio in accordance with the existing timetable, taking into consideration various factors such as the energy policy and the impact on electricity tariffs.
2. Risk Assessment		
Academia	<ul style="list-style-type: none"> Noted that the acceptable carcinogenic risk in the discussion paper adopted the USEPA acceptable cancer risk range of 10^{-6} to 10^{-4} and commented that for a small population, actions might need to be undertaken when the cancer risk approached 10^{-4}. Clarification requested on (1) whether the current human health carcinogenic risk assessment was on the occupational sub-population or the general local population; and (2) whether EPD's estimated cancer risk values were closer to 10^{-4} or 10^{-6}. 	<ul style="list-style-type: none"> EPD clarified that the 10^{-6} - 10^{-4} was an acceptable range adopted by USEPA for regulatory purposes to protect human health. The Government considered that a carcinogenic risk close to 10^{-4} would raise the red flag and warrant follow-up actions. EPD presented data on screen which clearly indicated that most of the estimated carcinogenic risks of POPs were orders below 10^{-6}, with only a couple falling between 10^{-6} and 10^{-5}, and none of the values was close to 10^{-4}.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	<ul style="list-style-type: none"> • Commented that the use of generic food consumption pattern in Far East countries was a good starting point providing a preliminary assessment of POPs exposure via the dietary pathway. However, the local population, having the 4th highest seafood consumption in the world, would be likely to have food consumption patterns which differed largely from those in other places. There was a clear need for the Government to obtain data on local food consumption patterns on a population level specific to HK in order to conduct more reliable dietary exposure risk assessments on POPs. • There was also a need for the Government to assess potential risks imposed by POPs on certain critical groups such as local fishermen, industrial workers and school children. 	<ul style="list-style-type: none"> • EPD responded that the stakeholder's point was well-taken and that the draft HKSARIP had included a high priority action item to conduct a population-based food consumption survey of local residents, and to conduct Total Diet Studies in the future when additional resources became available.
	<ul style="list-style-type: none"> • In making environmental and human health risk assessments, suggested that the Government consider strengthening collaboration with the local academia who possessed the necessary expertise. 	<ul style="list-style-type: none"> • EPD appreciated the stakeholder's suggestions and explained that the draft HKSARIP had proposed a number of action items to be conducted in collaboration with local academia, including further studies on POPs the local soil and vegetation, marine mammals and human breast milk/blood.
3. Public Awareness		
Academia	<ul style="list-style-type: none"> • Commented that the public awareness campaign would be a challenging task for the Government and risk communication was an important element of the process, to make the complicated POPs issue understandable to the general public. 	<ul style="list-style-type: none"> • EPD concurred and explained that as a measure to promote public awareness of POPs, EPD would launch a dedicated POPs thematic website under EPD's website, planned to be in January 2006, to disseminate accurate and science-based information on POPs to the local community.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	<ul style="list-style-type: none"> Suggested that the Education and Manpower Bureau should play an active role in educating local students the related science of the Stockholm Convention. The local NGOs indicated that they would be delighted to assist in the Government's education programmes by sharing their experience and established network in organizing POPs-related environmental activities. 	<ul style="list-style-type: none"> EPD responded that the Government as a whole would make concerted efforts in promoting public awareness of POPs related issues and welcomed NGOs' offer to help in launching the publicity raising campaign.
4. Regional Collaboration		
Academia	<ul style="list-style-type: none"> Noted that results of various local, regional and international joint studies had suggested some of the POPs (e.g. DDT, dioxins) might be transported into HK's environment through the air and water pathways. As HK local residents consumed drinking water and most of the major food items from southern China, regional collaboration would be critical in reducing and ultimately eliminating POPs in HK and in the PRD as a whole. It would be a great opportunity for HK to collaborate with counterparts in the Mainland, particularly the PRD, under the umbrella of the Stockholm Convention which called for global efforts to protect the environment and human health from the harmful effects of POPs. 	<ul style="list-style-type: none"> EPD appreciated the stakeholder's comments and responded that EPD had been in close liaison with the State Environmental Protection Administration (SEPA) in preparing the draft HKSARIP. The successful collaboration with Guangdong in regional air quality monitoring could be a good basis for further collaboration with Mainland counterparts including the academia on the POPs issues in the region.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	<ul style="list-style-type: none"> Noted that among the 26 countries/regions participated in the 3rd Round WHO Survey, HK was the only place that detected HCB in the breast milk. This might be associated with the production and application of lindane in the Mainland. There would be a need to draw up specific joint action plans for monitoring of POPs contamination in the air, water and food items and for enforcement in the region. 	<ul style="list-style-type: none"> EPD responded that as a first step, the Government needed to be clear about the POPs situation in HK before engaging Mainland counterparts in any joint actions. Regional joint monitoring would be initiated on a project basis as shown in the discussion paper. Local scholars would be welcome to provide relevant information and/or data on POPs contamination (e.g. the use of lindane), to facilitate follow-up work by the Government.
	<ul style="list-style-type: none"> Commented that studies by local academia had demonstrated that the long range transport of POPs to HK was occurring not only from the Mainland but also from the Southeast Asia region (e.g. Vietnam) in general. Levels of POPs in air (e.g. DDTs) had been seen to increase particularly in the summer monsoon season. Commented that characterization of POPs contamination in the PRD region would be crucial for the strategic planning for HK's collaboration with the Mainland counterparts in reducing the POPs emissions. Local universities could play a role in helping with the implementation programme by providing scientific advice and/or by participating in joint studies involving universities in the PRD region. 	<ul style="list-style-type: none"> EPD noted the study findings with interest. EPD explained that the draft HKSARIP had proposed action items to strengthen regional collaboration in the PRD, including promoting the standardization of monitoring and risk assessment methodologies and enhancing information exchange and knowledge sharing, and conducting joint regional monitoring of POPs on a project basis in the medium term (5 – 10 yr). The Government appreciated and would continue to rely on support in various forms from the academics in HK and the Mainland for successful implementation of the proposed actions to effectively reduce and ultimately eliminate POPs in the region.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
5. Capacity Building		
Academia	<ul style="list-style-type: none"> Explained that the Area of Excellence (AoE) involving 7 local universities was currently conducting research on marine environmental protection. The novel technologies being developed in many areas of work included molecular biology techniques and biomarkers, making it possible to detect POPs, many of which were also endocrine disruptors, in the environment at very low levels. These novel technologies would be useful to the Government in promoting local capacity building, especially in marine monitoring and risk assessment work. 	<ul style="list-style-type: none"> EPD appreciated the information and responded that active participation of local academia would be crucial in enhancing local POPs monitoring and analytical capacities. It would be more cost-effective in implementing the HKSARIP if local laboratories could provide POPs analytical services achieving the necessary reporting limits for meaningful data interpretation.
	<ul style="list-style-type: none"> Commented that POPs levels should be frequently monitored especially during and after major pollution incidents. 	<ul style="list-style-type: none"> EPD confirmed that the Government had put in place various emergency response mechanisms and would continue to ensure the impact of any POPs-related incidents were adequately monitored and assessed.
Professional Bodies	<ul style="list-style-type: none"> Requested clarification on the status of POPs pesticide control in the Mainland and asked if HK residents would be allowed to bring from the Mainland into Hong Kong any unregistered POPs. 	<ul style="list-style-type: none"> AFCD clarified that the 9 POPs pesticides were either not registered or had their registration cancelled for many years in HK due to toxicological or environmental concerns. Any person who brought any of these POPs pesticides (irrespective of quantities) from the Mainland into HK would be committing an offence unless with a valid permit granted under exceptional circumstances.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	<ul style="list-style-type: none"> Requested clarification on whether the Government would consider imposing control on pesticide application and require specific training for pesticide users and asked whether there was any legislative control on the active carriers of pesticides. 	<ul style="list-style-type: none"> AFCDC explained that the Pesticides Ordinance (PO) currently controlled the import, supply, retail, manufacture and possession (but not application) of pesticides in HK. The Government was considering amendments to the PO to impose control on the application of pesticides by users, e.g. pest control companies. Under the PO, the registrants were required to declare the full composition of pesticides under registration, including both the active ingredients and the inert ingredients.
Special Interest Groups	<ul style="list-style-type: none"> Commented that as a large proportion of HK's food supply came from the Mainland, it would be necessary to impose more effective control, by stepping up surveillance and preventive measures/laws. For example, (1) cancellation of the offender's licence or accreditation for food supplies; and (2) to promulgate the relevant legal and administrative measures/procedures to business people in the food supply industry to better safeguard the health of local residents. 	<ul style="list-style-type: none"> EPD responded that the Government would keep in view the stakeholder's suggestions in future planning.

Details of Stakeholder's Written Feedback



FAXED
25/11/05
5:00 pm

Ref. 188-05-COC-POP

25 November 2005

Environmental Protection Department
28/F Southorn Centre
130 Hennessy Road
Wan Chai
Hong Kong

Mail and Fax
2574 6571

Attn: Dr. Ma Wing Yee, Stephanie/ Dr. Yang Rong
Senior Environmental Protection Officer (Cross-Boundary & International)/
Environmental Protection Officer (Cross-Boundary & International)

Dear Dr. Ma and Dr. Yang,

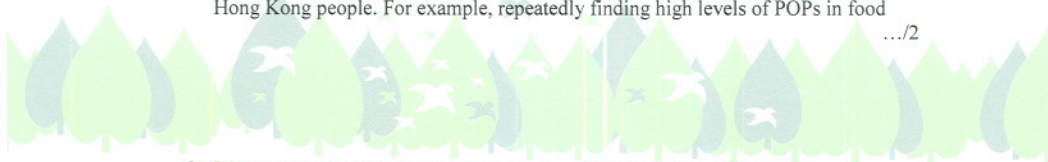
Response to Stakeholder Consultation Workshop on
the Preparation of the Hong Kong Implementation Plan (HKIP) for
the Stockholm Convention on 18 November 2005

We would like to send our congratulations to your workshop which was well organised. We also appreciated that your staff had sent us detail information before the workshop so we can study ahead.

After participated in the workshop and gathered the comments from Green Council's consultants, we have the following suggestions for your preparation of the HKIP:

1. The results of the POPs levels in dietary exposure studied on 2003 indicating that, in general, POPs levels were low. In Hong Kong, a great proportion of food is supplied from China. As indicated in the Workshop, DDT, Chlordane and Mirex are still accepted be used and in production in Chinese Mainland. For sure, EFHD will keep on their monitoring work to measure the POPs level their routine food surveillance programme. However, food supply to Hong Kong is arranged and monitored by AFCD and some other Departments under various schemes. It would be good to have indicative measures/laws be clearly stated and be well known by business people responsible for food supply to Hong Kong that they have to make sure POPs are not unintentionally send to Hong Kong and go into the food chain for Hong Kong people. For example, repeatedly finding high levels of POPs in food

.../2



Rm. 710 New World Tower 1, 18 Queen's Road Central, Hong Kong 香港中環皇后大道中18號新世界大廈一期710室
Tel 電話: 2810 1122 Fax 傳真: 2810 1998 Website 網址: www.greencouncil.org

-2-

will result in termination of granting of any of the various organic labels or accredited farms.

2. It is considered that POPs level should be frequently monitored during and after major pollution incidents.
3. EMB should pay an active role to educate local students the related science for Stockholm Convention.
4. In terms of environmental education promotion, we considered that it is important to laid out an effective strategy that able to convey the information of POPs to the public. If you are intended to extend your environmental education for schools, we would be delighted to assist your programme. For your information, over years Green Council have accumulated a large school network from environmental education activities, both sponsored by Quality Education Fund and other sources. In addition, we have experience in promoting new concepts to students, such as Hong Kong Green Label Scheme (initiated by Green Council) as well as green consumption and purchasing.

We hope the above suggestions are able to assist you. Should you have any queries, please contact us at telephone number 2810 1122.

Yours sincerely,



Linda W. P. Ho
Chief Executive Officer

LH/sc

Appendix F

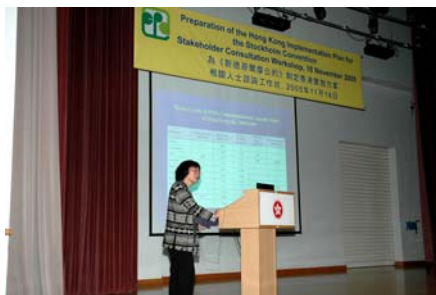
Snapshots of the Stakeholder Consultation Workshop in Action



Mr. Esmond Lee, Deputy Director of Environmental Protection, gave opening remarks at the Stakeholder Consultation Workshop.



Stakeholders from various sectors of the community attended the Workshop.



Dr. Stephanie Ma, leader of EPD's POPs team, made a presentation to stakeholders on the preparation of the draft HKSARIP.



Panel members comprised officials from Government Departments including EPD, AFCD, DoH, and FEHD.



A panel discussion session was held during the workshop for stakeholders to make comments and exchange views with Government officials.

The People's Republic of China

National Implementation Plan for the Stockholm
Convention on Persistent Organic Pollutants

Part III

(Implementation Plan of Macao Special Administrative Region for
the Stockholm Convention on Persistent Organic Pollutants)

**Implementation Plan of the *Stockholm Convention*
on *Persistent Organic Pollutants***

Macao Special Administrative Region

May 17, 2006

Index

	Page
I. Forward	1
II. Basic Information on Macao Special Administrative Region (SAR)	2
2.1 General information	2
2.1.1 Geography and population	2
2.1.1.1 Geographical location	2
2.1.1.2 Population	2
2.1.1.3 Medical Service	3
2.1.2 Political system and economic development	3
2.1.2.1 Political system	3
2.1.2.2 Economic development	4
2.1.2.2.1 General information	4
2.1.2.2.2 Economic activities relating to the management of POPs	4
2.1.3 Environmental situation	6
2.1.3.1 Atmospheric environment	6
2.1.3.2 Water resources	6
2.1.3.2.1 Drinking water	6
2.1.3.2.2 Sewage treatment	6
2.1.3.2.3 Water quality of coastal area	7
2.1.3.3 Wastes	7
2.2 Environmental policies, laws and relevant systems	8
2.2.1 Environmental policies and legal system	8
2.2.2 Departments involved in implementation of the Convention and management of POPs and their functions and responsibilities	8
2.2.2.1 Departments under Secretariat for Administration and Justice	8

2.2.2.2	Departments under Secretariat for Economy and Finance	9
2.2.2.3	Departments under Secretariat for Security	10
2.2.2.4	Departments under Secretariat for Social Affairs and Culture	10
2.2.2.5	Departments under Secretariat for Transport and Public Works	11
2.2.3	International Conventions concerning the control of POPs and applicable to Macao SAR	12
2.2.4	Rules and regulations concerning the control of POPs	12
2.2.4.1	Regulations concerning the import and export of POPs	12
2.2.4.2	Regulations on the production of POPs	12
2.2.4.3	Regulations on the use of POPs	12
2.2.4.4	Regulations on transport and storage of POPs	12
2.2.4.5	POPs-related environmental and release standards	12
2.3	Basic Information on POPs	13
2.3.1	Status of POPs used as pesticides in Part I of Annex A of the Convention	13
2.3.1.1	Import	13
2.3.1.2	Export	13
2.3.1.3	Use	14
2.3.2	Status of PCBs in Part II of Annex A of the Convention	14
2.3.2.1	Import	14
2.3.2.2	Export	14
2.3.2.3	Use	14
2.3.3	Status of DDT in Annex B of the Convention	15
2.3.3.1	Import	15
2.3.3.2	Export	15
2.3.3.3	Use	15

2.3.4	Status of unintentional release of POPs in Annex C of the Convention	15
2.3.5	Relevant possible contaminated sites	15
2.3.6	Use and release of POPs under specific exemption	15
2.3.7	Data concerning relevant studies and investigations	16
2.3.7.1	Study and investigation data from governmental sector	16
2.3.7.2	Study and investigation data from academic institutions	16
2.3.8	Basic technical forces on POPs assessment, management, research, investigation, monitoring and analysis	17
2.3.9	Status of population and the environment affected by POPs as well as the impacts imposed by POPs on public health, environmental quality and relevant workers and groups	17
2.3.10	Status quo of to what extent the public and social groups recognize POPs issue as well as relevant dissemination and education efforts	17
2.3.11	Regulatory system for chemicals in-use in Macao, including evaluation mechanism, new mechanisms and other relevant regulations	18
III.	Strategy to perform the implementation plans as well as the capacity building and priorities to implement the Convention	19
3.1	Guidelines and policies for implementation	19
3.2	Objectives of implementation plans	19
3.3	Strategy for the implementation plans	19
3.3.1	The First phase	19
3.3.2	The Second phase	20
3.4	Relevant capacity building for implementing the Convention and the priorities	20
IV.	Action Plan for the Implementation of the Convention	21
4.1	Action plan of the first phase	21
4.1.1	Develop relevant mechanism to implement the Convention and designate executive bodies	21
4.1.2	Develop laws to forbid or control the import, export and transfer of POPs	21

4.1.3	Gradually carry out systematic surveys and evaluation of POPs in Macao	22
4.1.3.1	Surveys and evaluation of basic situation of PCBs in Macao	22
4.1.3.2	Surveys and evaluation of basic information on unintentional release of POPs in Macao	23
4.1.3.3	Surveys and evaluation of basic information on POPs (used as pesticides) in Annex A of the Convention in Macao	24
4.1.3.4	Surveys and evaluation of basic information on DDT in Macao	25
4.1.3.5	Surveys and evaluation of sites contaminated by POPs	25
4.1.4	Control the emission of new sources of unintentional release of POPs	25
4.1.5	Gradually establish data collection mechanism and database on POPs status in Macao	26
4.1.6	Conduct initial campaigns on the publicity, awareness and education of POPs	26
4.2	Action Plan of the second phase	27
4.2.1	Develop specific action plan to eliminate and control PCBs, the unintentional production and release of POPs, POPs used as pesticides in Annex A of the Convention and DDT	27
4.2.2	Strategy and action plans for sustained publicity, public awareness and education	28
4.2.3	Action plan for relevant studies, development and monitoring	29
4.2.4	Submitting reports and the mechanism to evaluate the effectiveness of the implementation of the Convention	29
4.2.5	Assess technical assistance and funding mechanism	30
V.	Fiscal Expenditure and Relevant Financial Arrangement	31

I. Forward

Persistent Organic Pollutants (POPs) mainly come from human industrial and agricultural activities. As POPs are of severe toxicity, persistency (hard to degrade), easy to evaporate (long-distance transmission) and accumulate in organisms, they may pose serious threat to and have huge impact on human health and the whole eco system since they have been largely scattered in air, soil, lakes and oceans.

In order to control and ultimately eliminate the production, use, discharge and storage of these toxic chemicals and to protect human kind and the environment from potential hazard, many countries in the world adopted the *Stockholm Convention on Persistent Organic Pollutants* (hereinafter referred to as Convention) in Stockholm, Sweden on May 22, 2001. This Convention specifies the control measures on 12 kinds of POPs in the first step, including Aldrin, Chlordane, DDT, Dieldrin, Endrin, HCB, Heptachlor, Mirex, Toxaphene, PCBs, Dioxins and Furans.

The People's Republic of China signed the Convention in 2001 and submitted its ratification letter to the UN Secretary-General for the record in 2004. The Convention became effective for China as of Nov. 11, 2004.

Stockholm Convention on Persistent Organic Pollutants was applied to Macao Special Administrative Region since Nov. 22, 2004 as Gazette No. 41/2004 from the SAR Chief Executive notified.

II. Basic Information on Macao Special Administrative Region (SAR)

General information

Geography and population

Geographical location

Located in the southern end of the Pearl River Delta, Macao borders Guangdong Province and is 60 km away from Hong Kong. It consists of Macao Peninsula, Taipa Island, Coloane Island and CoTai reclamation zone. The total area of Macao by 2004 was 27.5 sq. km., of which Macao Peninsula covered 8.8 sq. km, Taipa Island and Coloane Island respectively 6.4 sq. km. and 7.6 sq. km. and CoTai reclamation zone 4.7 sq. km.¹

The famous historic districts of Macao were put on the List of World Cultural Heritage by UNESCO in July of 2005.

Population

The number of residents of Macao was about 465,000 by Dec. 31, 2004 with male accounting for 48.0% and female 52.0%. The average population density was 16,921 per sq. km. Approximately 90% of the population live on Macao Peninsula.²

According to the census data in 2001, 95% of the population in Macao was of Chinese nationality and the rest are Portuguese, Filipinos and so on. Of those aged above 3 years old, 45% have educational background from middle school to higher education. The official languages of Macao were Chinese and Portuguese with over 97% of its residents speaking Chinese and 0.7% speaking Portuguese.³

There were 16.673 million travellers coming to Macao in 2004, increasing by 40.2% compared to 11.888 million in 2003.⁴

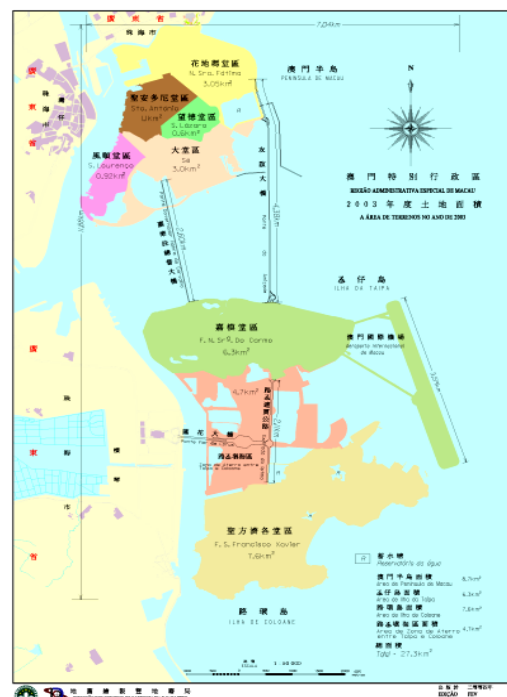


Figure 1 Geographic Location of Macao

¹ Sources: Statistics and Census Service, 2005

² Sources: Statistics and Census Service, 2005

³ Sources: Statistics and Census Service, 2001

⁴ Sources: Statistics and Census Service, 2005

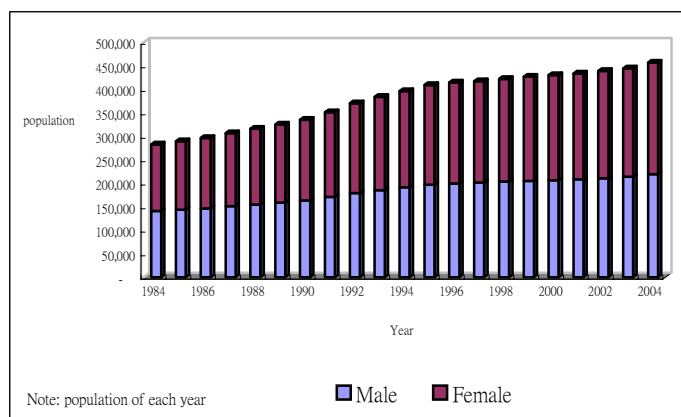


Figure 2 Population Change of Macao from 1984 to 2004⁵

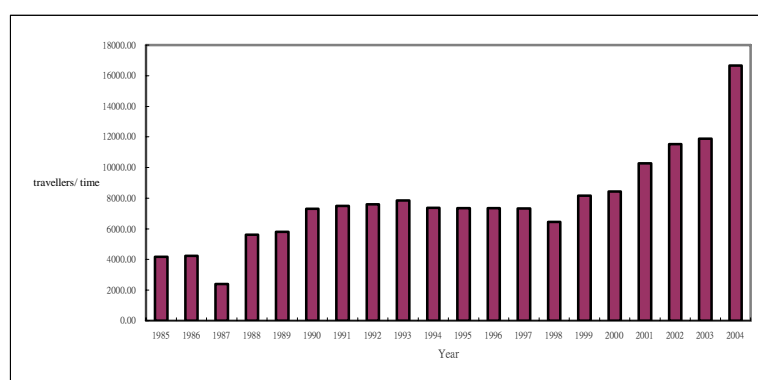


Figure 3 Number of Outside Travellers from 1985 to 2004⁵

Medical service

In 2004, every doctor and nurse of Macao served 454 and 438 residents respectively and 473 residents share one hospital bed. The average life expectancy from birth was 79.2 years old with male expected to be 77.4 years old and female 82.0 years old (2000-2003)⁵.

Macao formally joined World City Alliance for Health in 2004, marking Macao’s commitment to push ahead with its long-term plan for a healthy city and healthy life style as well as its resolution to launch effective promotion and education activities on health.

Political system and economic development

Political system⁶

The People’s Republic of China resumed its sovereignty over Macao on December 20, 1999. According to Article 31 of the *Constitution of People’s Republic of China*, Macao, in light of the “One Country, Two Systems” principle, is established as a Special Administrative Region and will retain its capitalistic system and life style for 50 years.

⁵ Sources: Statistics and Census Service, 2005

⁶ Sources: Macao Year Book 2004; website of Macao SAR government: www.gov.mo

The Basic Law of the Macao Special Administrative Region of the People's Republic of China (Basic Law) is the constitutional document of Macao SAR. All systems and policies of Macao shall be developed according to the provisions of the Basic Law, including social and economic systems, system safeguarding people's basic rights and freedom, administration, legislation and justice systems as well as relevant policies.

The government of Macao SAR is the administrative body of Macao and its principal is called Chief Executive. Macao SAR government is responsible for formulating and implementing policies, managing all administrative affairs, handling all the foreign affairs authorized by the central government as stipulated in the Basic Law, preparing and lodging financial budget and final accounts, proposing acts and bills, drafting administrative regulations and dispatching officials to attend legislative meetings as observers or making speeches on behalf of the government.

Economic development⁷

General information

Calculated in constant price, the GDP of Macao in 2003 and 2004 was respectively MOP63.56 billion and MOP82.69 billion. The average GDP per capita was MOP142,820 and MOP180,965 or USD18,000 and USD23,000. (The Pataca (MOP\$) is Macao's official currency, roughly 8 Patacas is equivalent to 1 US Dollar.)

The work forces of Macao in 2004 were 229,000 of which 218,000 were in employment. The labor participation rate was 61.9% with unemployment rate being 4.8% and underemployment rate being 1.9%.

Economic activities relating to the management of POPs

1. Foreign trade

The total import value of Macao in 2004 was MOP27.9 billion with consumables, raw materials and semi-products, capital goods, fuels and lubricant respectively accounting for 39.3%, 35.8%, 17.2% and 7.7%.

The total export value of Macao in 2004 was MOP22.56 billion including local products worth MOP17.32 billion, which were mainly textiles and garments. The export destination is USA and EU.

2. Industries⁸

Industries in Macao can be divided into three categories: mining, manufacturing and power, the production and distribution of gas and water. There were 1,153 industrial sites in 2003 including 1,148 sites for manufacturing activities, accounting for 99.6% of the total.

⁷ Sources: Statistics and Census Service, 2005

⁸ Sources: Statistics and Census Service, 2005

Although manufacturing dominates Macao's industrial activity, its contribution to GDP is declining year on year as the service sector keeps rising rapidly. In 2004 there were about 36,000 people engaged in manufacturing, taking up 16.5% of the total population of employment.

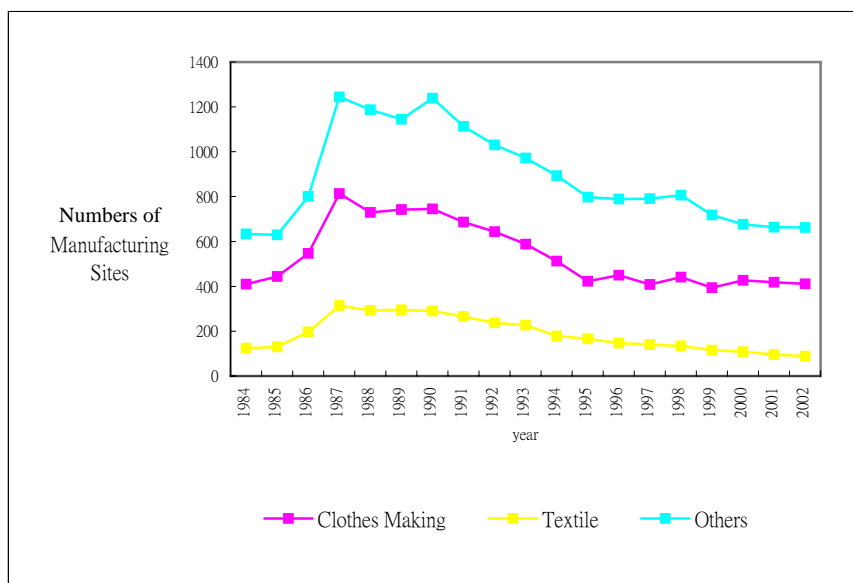


Figure 4 Change of Numbers of Manufacturing Sites of Macao⁸

Available information shows that the following industrial sources have the potential for unintentional release of POPs stated in annex C of the Convention:

1. one incinerator plant
2. one of the sewage treatment plants with sludge incinerating equipment.

Due to the lack of related information, it is impossible to evaluate and assess the real situation concerning the unintentional release of POPs stated in Annex C of the Convention.

3. Agriculture

With socio-economic development agricultural activities have faded away in Macao. According to statistics, only 200 people engaged in agriculture and related industries in Macao in 2004, constituting 0.09% of the total population of employment.⁹

⁹ Sources: Statistics and Census Service, 2005

Environmental situation

Atmospheric environment

The air quality of Macao is affected not only by local pollution sources but also external factors.

The major pollution sources in Macao include car emission, waste gas from power plants and a spot of pollution sources from industrial and commercial activities.

Macao's air quality is influenced by such external factors as weather conditions and atmospheric environment of neighboring areas.

According to monitoring data on air quality in 2004, 55% of days in the year enjoyed good air quality, 35% scored average and 10% of days were of bad quality.¹⁰

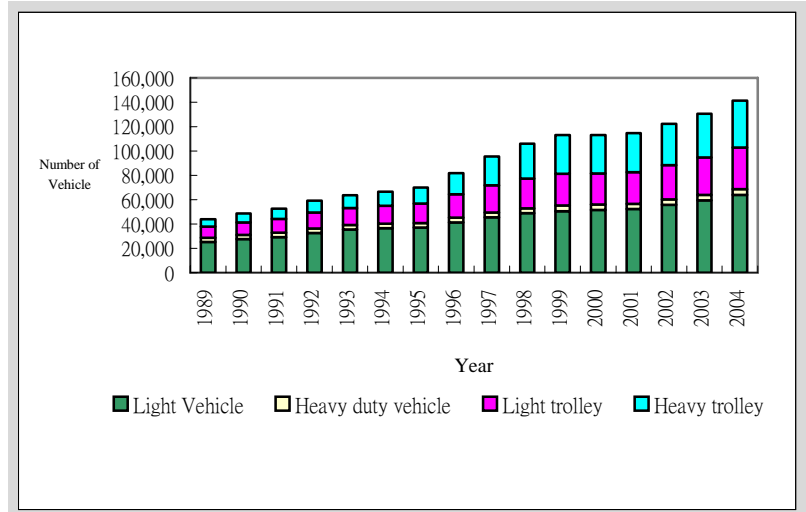


Figure 5 Change of Number of Vehicles in Macao⁹

Water resources

Drinking water

98% of the sources of drinking water in Macao come from the West River, a main tributary of the Pearl River.

There is a specialized company in charge of the treatment of drinking water in Macao. The SAR government supervises the operation of the company and monitors the quality of water running out of the company and water of the tap water network. Macao adopts EU's standard for drinking water.

The major water consumption unit of Macao in 2004 was still households (accounting for 52% of the total consumption), followed by industrial and commercial sectors (accounting for 40% of the total). The daily water consumption per capita in 2004 was 350 liters whereas as far as household consumption is concerned, the consumption was narrowed down to 162 liters.¹¹

Sewage treatment

¹⁰ Sources: Statistics and Census Service, 2005

¹¹ Sources: Statistics and Census Service, 2005

In order to protect water quality in the coastal area and address environmental problems caused by urban sewage, Macao has made plans to improve its drainage network since the middle of 1980s. Four sewage treatment plants have been set up in Macao Peninsula, Taipa Island and Coloane Island and no sewage will be discharged into the nearby waters until secondary treatment is completed.

Water quality of coastal area

Macao started to monitor water quality of coastal waters since 1995 in order to trace the trend of water quality. The monitoring work is conducted at 12 sites along the coast.

The monitoring results of 2004 showed that the major pollutants at nearby waters were eutrophication substances such as nitrogen and phosphorus.¹²

Wastes

Macao disposes wastes mainly through incineration and takes landfill as supplementary method. Most of the domestic refuse are disposed through incineration. In 2004, 256,000 tons of solid wastes were generated, equal to 1.5kg per capita per day, of which domestic refuse accounted for 60% and industrial and commercial wastes accounted for 20%.¹³

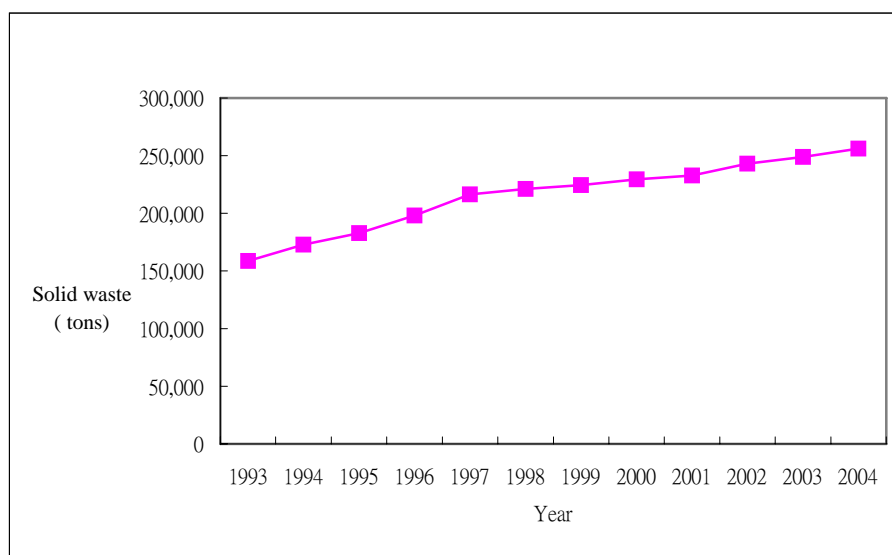


Figure 6 Change in solid waste generation of Macao¹³

¹² Sources: Department of Health, 2005

¹³ Sources: Statistics and Census Service, 2005

Environmental policies, laws and relevant systems

Environmental policies and legal system

To promote sustainable development and gradually enhance people's life quality is the goal of the government of Macao SAR.

Regarding the legal system on environment, Article 119 of the Basic Law stipulates that the government of Macao SAR performs the duty of protecting environment according to law. *The Guiding Law on Environment* also defines guidelines and principles for the development of Macao's environmental policies. In addition, Macao is taking steps to formulate and improve relevant laws and regulations for different aspects of environmental protection.

Departments involved in implementation of the Convention and management of POPs and their functions and responsibilities¹⁴

Departments under Secretariat for Administration and Justice

1. International Law Office

Functions concerning the implementation of the Convention and management of POPs:

Providing necessary legal assistance to negotiation and conclusion of international laws and their application to Macao SAR; assisting in the preparation efforts of international and regional legal and judicial aid.

Responsibilities concerning the implementation of the Convention and management of POPs:

- 1) Providing legal assistance on procedures for Macao to assume obligations externally;
- 2) Collecting and studying on regulations, proposals or mandates applicable to Macao SAR issued by international organizations, following up the activity of incorporating above regulations, proposals or mandates into Macao's legal system and assisting authorities of Macao to draft acts;
- 3) Promoting, compiling or making plans for the preparation of reports, giving reply to questionnaires or providing data as requested by international organizations within the scope of legal affairs; these tasks should be carried out on the premise that the authority of and interaction with other agencies are not affected;
- 4) Follow-up activities on the promulgation of international laws applicable to Macao SAR;
- 5) Providing international law-related consulting services to public administrations and departments;
- 6) Providing assistance in drafting legal documents and implementing tasks assigned by higher authorities through cooperation with other departments of Macao SAR.

2. Legal Affairs Bureau

¹⁴ Sources: website of Macao SAR government: www.gov.mo

Functions concerning the implementation of the Convention and management of POPs:
Administering research and technical support work on overall legal policies;
implementing specific tasks such as drafting and translation of legal documents as well as
promotion of law.

Responsibilities concerning the implementation of the Convention and management of
POPs:

- 1) Assisting in development of legal policies;
- 2) Working out or assisting in working out legal proposals, regulatory documents or other
drafts needed to be published in The Gazette of the Government of Macao SAR within
the jurisdiction of Chief Executive or Macao SAR government;
- 3) Promoting and providing legal information in Macao SAR.

3. Civil and Municipal Affairs Bureau

Functions concerning the implementation of the Convention and management of POPs:

City planning, public health, maintaining and safeguarding the environment and people's
life quality.

Responsibilities concerning the implementation of the convention and management of
POPs:

- 1) Promoting environmental health, particularly ensuring the cleaning-up of public place
and management of animals; cooperating with entities or public agencies that exercise
the power of health authority;
- 2) Planning, promoting and carrying out training and disseminating information for the
education of citizens;
- 3) Committed to the promotion of people's life quality, especially reconstruction of oil
urban area, upgrade of related facilities and improvement of environment;
- 4) Supervising compliance of requirements applicable to all above items according to
laws and regulations, particularly in such fields as public health, management of
animals, environmental protection and activities and projects subject to administrative
permit.

Departments under Secretariat for Economy and Finance

1. Macao Economic Services

Functions concerning the implementation of the Convention and management of POPs:

Assisting in the development and implementation of economic policies concerning
economic activities.

Responsibilities concerning the implementation of the Convention and management of
POPs:

- 1) Assisting in the formulation of economic policies and development of industries

- according to its terms of reference;
- 2) Issuing license for industrial sites and making record on industries, monitoring and supervising related activities;
 - 3) Issuing license to enterprises, transportation enterprises, tax warehouses, duty-free shops that deal with fuel products as well as other non-industrial sites whose licenses shall be issued by Macao Economic Services as stipulated by law, and carrying out relevant supervision activities;
 - 4) Issuing permits for foreign trade;
 - 5) Managing restriction system on foreign trade;
 - 6) Issuing certificate of origin of Macao SAR according to law.

2. Statistics and Census Service

Functions concerning the implementation of the Convention and management of POPs:

Giving guidance to, coordinating, implementing and supervising statistical activities of Macao SAR.

Responsibilities concerning the implementation of the Convention and management of POPs:

- 1) Preparing statistics on the quality and quantity of population, social, economic and environmental indicators;
- 2) Studying, developing and employing statistic methods for compilation, induction and analysis;
- 3) Coordinating with other departments and providing official statistics on Macao SAR to foreign countries and international organizations.

Departments under Secretariat for Security

1. Macao Customs Service

Functions concerning the implementation of the Convention and management of POPs:

Leading, enforcing and inspecting measures concerning customs policies, providing police service of managing and supervising customs affairs.

Responsibilities concerning the implementation of the Convention and management of POPs:

- 1) Preventing, combating and curbing fraud;
- 2) Committed to preventing and curbing illegal trafficking;
- 3) Coordinating with other departments to supervise foreign trade activities and making contributions to the development of foreign trade so as to uphold the credibility of Macao SAR in international community.

Departments under Secretariat for Social Affairs and Culture

1. Department of Health

Functions concerning the implementation of the Convention and management of POPs:

Promoting health and disease prevention and control through coordination with public and private health organizations and by providing primary and specialized health care services needed in public welfare.

Responsibilities concerning the implementation of the Convention and management of POPs:

- 1) Making preparations for and implementing tasks that promote and guarantee public health and prevent diseases;
- 2) Studying on health science, conducting training of health care personnel and providing assistance to the training;
- 3) Supervising and providing assistance to entities engaged in health care services;
- 4) Providing technical assistance to other health organizations of Macao SAR.

Departments under Secretariat for Transport and Public Works

1. Environmental Council

Functions concerning the implementation of the Convention and management of POPs:

Assisting the Chief Executive to develop environmental policies for Macao SAR and to ensure and coordinate with the authority to promote and enforce relevant plans, measures and activities.

Responsibilities concerning the implementation of the Convention and management of POPs:

- 1) Putting forward suggestions on the protection and conservation of the environment, nature and ecological balance of Macao SAR;
- 2) Submitting to the Chief Executive proposals on legislative measures to protect and safeguard the environment, nature and ecological balance;
- 3) Ensuring the link and interaction among plans, measures and activities concerning environmental policies promoted by the public administration of Macao SAR;
- 4) Concluding cooperation agreements and protocols with counterparts inside and outside Macao SAR and conducting activities, especially training and promotion on the protection of environment, nature and eco balance;
- 5) Proposing and organizing training, publicity and promotion activities, especially on the subject of environmental education;
- 6) Making proposals on license application that may have influence on the environment, nature and eco balance;
- 7) Supervising the enforcement and compliance of rules and regulations on environment;
- 8) Facilitating scientific research on environment, nature and eco balance;
- 9) Preparing and approving annual report on the state of the environment of Macao SAR, and submitting the report to the Chief Executive.

2. Infrastructure Development Office

Functions concerning the implementation of the Convention and management of POPs:

Expediting and coordinating all the activities that aim to maintain, modernize and develop the infrastructure system of Macao SAR.

Responsibilities concerning implementation of the Convention and management of POPs:

- 1) Facilitating and coordinating activities of solid waste incineration center and sewage treatment station;
- 2) Making investigations on increasing the amount of waste for disposal, particularly on dangerous goods, special wastes and renewal and modernization of such treatment facilities;
- 3) Monitoring the operation of sewage treatment plants by controlling the quality and quantity of purified water;
- 4) Monitoring activities of solid waste incineration centers and sewage treatment plants operated by licensed operators as well as transfer and cleaning up of solid wastes.

International Conventions concerning the control of POPs and applicable to Macao SAR

Currently, the international conventions relating to POPs and applicable to Macao SAR include the following:

1. *Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal* (1989), taking effect in Macao SAR on May 27, 2002 as approved by the Chief Executive through Gazette No. 32/2002;
2. *Stockholm Convention on Persistent Organic Pollutants* (2001), coming into force in Macao SAR on Nov. 22, 2004 as approved by the Chief Executive through Gazette No.41/2004;
3. *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade* (1998), going into effect in Macao SAR on May 31, 2005 as approved by the Chief Executive through Gazette No.12/2005.

2.2.4. Rules and regulations concerning the control of POPs

2.2.4.1 Regulations concerning the import and export of POPs

Laws and regulations concerning the import and export of POPs include *Foreign Trade Law* and Chief Executive's instructions No. 225/2003 and No. 263/2003. According to above law and regulations, import of HCB and DDT, which are two kinds of POPs and other products such as pesticides, raticides, antiseptics and herbicides is subject to import permit, which is issued by Department of Health. However, there are no regulations concerning the export of POPs and related products.

2.2.4.2 Regulations on the production of POPs

There are no special laws or regulations on the production of POPs or other chemicals in Macao SAR.

2.2.4.3 Regulations on the use of POPs

There are no regulations, specifications and standards on the use of POPs in Macao SAR.

2.2.4.4 Regulations on transport and storage of POPs

There are no regulations, specifications and standards on transport and storage of POPs in Macao SAR.

2.2.4.5 POPs-related environmental and release standards

There're no POPs-related environmental and release standards in Macao.

2.3 Basic information on POPs

2.3.1 Status of POPs used as pesticides in Part I of Annex A of the Convention

2.3.1.1 Import

In view of no separate codes for the eight kinds of pesticides that are listed in Part I of Annex A of the Convention in '*Classification Table/Coordination System of Goods for Foreign Trade in Macao* (the 3rd edition)' (HS2002), it is hard to tell the exact import and export volume. However, according to the foreign trade statistics during 1996 and July 2005, the imports of two kinds of goods (the codes being 29349900 and 38089090), which are likely to contain Toxaphene or Mirex, amount to 1,289kg and 69,547kg¹⁵ respectively. What deserves mention is that the above codes involve more than one category of products, so the exact import volume of goods containing Toxaphene or Mirex is beyond estimation.

Nevertheless, according to the data from the Department of Health, in order to safeguard the residents' health and protect the environment, Macao has ceased the import of six pesticides or bactericides listed in Part I of Annex A of the Convention, that is, Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor and Toxaphene since the year 1994.

2.3.1.2 Export¹⁶

In accordance with the foreign trade statistics during 1996 and July 2005, there're records concerning the re-export of goods (the codes are 29349900 and 38089090) that may contain Toxaphene or Mirex, and the export volume is 45kg and 1,081kg¹⁷ respectively. However, it should be noted that the codes of above-mentioned goods include more than one category of products; therefore, the exact export volume of goods with Toxaphene or Mirex cannot be estimated.

¹⁵ The '*Classification Table/Coordination System of Goods for Foreign Trade in Macao* (the 3rd edition)' (HS2002) does not have a separate code for the goods, so the data for imports and exports are found in a larger range in HS2002, which means that the data probably include that of other goods.

¹⁶ Including re-export and temporary export

¹⁷ The '*Classification Table/Coordination System of Goods for Foreign Trade in Macao* (the 3rd edition)' (HS2002) does not have a separate code for the goods, so the data for imports and exports are found in a larger range in HS2002, which means that the data probably include that of other goods.

2.3.1.3 Use

Macao has ceased the use of Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor and Toxaphene since 1994.

2.3.2 Status of PCBs in Part II of Annex A of the Convention

2.3.2.1 Import

In accordance with the foreign trade statistics from 1996 to July 2005, the imported goods with the code of 29036900 are recorded to probably contain PCBs and the quantity is 1,242kg¹⁸. However, it is notable that since the code mentioned above covers more than one category of products, the exact import volume of goods with PCBs is beyond estimation.

2.3.2.2 Export

There're no export records of PCBs or goods with code of 29036900 that may contain PCBs according to foreign trade statistics during 1996 and July 2005.

2.3.2.3 Use

In line with the data provided by relevant electric power suppliers, of all the transformers that are in-use in power supply equipment in Macao, only three contain PCBs and most of them do not have PCBs. The detail information of transformers with PCBs is showed in Table 1. The transformers with PCBs shall cease in-use in early 2006. However, at the moment, there is no regulation or standard in Macao stipulating the use of transformers with PCBs.

Table 1 The detail information of transformers with PCBs

Transformers	Manufacturer	Year of Production	Specification	Size(L*W*H (mm))	Total Weight (kg)	Weight of Insulation Oil with PCB(kg)
SA1	Brown Boverly Corporation (BBC)	1982	Capacity:1600KVA ; Voltage : 11000/400V ; Current : 84/2309 A ; Frequency : 50 Hz	2160*1110 *1950	3700	780
SA2	Brown Boverly Corporation (BBC)	1983	Capacity:1250KVA ; Voltage : 11000/400V ; Current : 65.6/1804 A ; Frequency : 50 Hz	2015*1000 *1950	3120	675
SA3	EFACEC-Portugal	1982	Capacity:1000KVA ; Voltage : 11000/400/225V ; Current : 52.49/175 A ; Frequency : 50 Hz	2546*1396 *2020	6000	2150

¹⁸ The 'Classification Table/Coordination System of Goods for Foreign Trade in Macao (the 3rd edition)' (HS2002) does not have a separate code for the goods, so the data for imports and exports are found in a larger range in HS2002, which means that the data probably include that of other goods.

2.3.3 Status of DDT in Annex B of the Convention

2.3.3.1 Import

For the purposes of safeguarding public health and protecting the environment, Macao has ceased DDT import since 1994. Moreover, there are no records of DDT imports or imports of relevant goods in foreign trade statistics during 1996 and July 2005.

2.3.3.2 Export

According to the foreign trade statistics from 1996 to July 2005, no DDT exports or exports of relevant goods are recorded.

2.3.3.3 Use

Macao has ceased the use DDT since 1994.

2.3.4 Status of unintentional release of POPs in Annex C of the Convention

Macao has not undertaken investigations and studies on unintentional release of four kinds of POPs set forth in Annex C of the Convention, that is, Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF), Hexachlorobenzene (HCB) and Polychlorinated biphenyls (PCB). Therefore, Macao lacks the specific data concerning the sources of release, the release amount and the contents in the environment.

2.3.5 Relevant possible contaminated sites

Relevant investigation and studies have not been carried out on sites probably contaminated by POPs.

2.3.6 Use and release of POPs under specific exemption

The People's Republic of China has registered for the specific exemptions of the following four types of POPs.

Table 2. The Specific Exemptions and Acceptable Purposes of Four Types of POPs

Registered by People's Republic of China

POPs	Production	Use
Chlordane	Termiticide	Termiticide in buildings and dams
HCB	Intermediate	Intermediate
Mirex	Termiticide	Termiticide
DDT	Intermediate, disease vector control and ship antifouling paint	Intermediate, disease vector control and ship antifouling paint

The situation of the four POPs under specific exemptions in Macao is as follows:

1. Macao has ceased the import and use of Chlordane and DDT since 1994.

2. There are no data available concerning the import, export, production or use of HCB in Macao.
3. It is recorded in the foreign trade statistics during 1996 and July 2005 that 69,547kg of goods liable to contain Termiticide are imported to Macao. However, temporary lack of detailed investigation data prevents us from understanding the information on the use and release of Termiticide in Macao.

2.3.7 Data concerning relevant studies and investigations

Currently no data is available in Macao concerning the systematic study and investigation on POPs in the environment. There is only a little data of studies and investigations undertaken by governmental sector and academic institutions.

2.3.7.1 Study and investigation data from governmental sector

From September 2003 to August 2004, Macao Special Administrative Region monitored five POPs in the waters of inner harbor, that is, DDT, Aldrin, Chlordane, Dieldrin and Endrin. The results (see Table 3) revealed that the concentrations of the five POPs in the water body were generally on the high side.

Table 3. The Monitoring Results of the Five POPs

POPs	Range of concentration ($\mu\text{g/L}$)
DDT	ND ¹⁹ ~0.687
Aldrin	ND ²⁰ ~ 0.163
Chlordane	ND ²¹ ~ 0.244
Dieldrin	ND ²² ~ 0.232
Endrin	ND ²³ ~ 0.782

2.3.7.2 Study and investigation data from academic institutions

In cooperation with scientific research institutions of Mainland China, the academic institutions in Macao carried out investigations and researches on POPs in sediments and water bodies of Pearl River Delta, inner harbor of Macao as well as adjacent seawaters in 1997, 1999 and 2001 respectively.

1. Research results of 1997 and 1999

In this research, sediment samples from the surface layers of Macao inner harbor and adjacent seawaters were collected, and analyses were made on organochlorine pesticides and other components. The items for analyses included two POPs under the Convention, PCBs and DDT. For relevant analysis results please refer to Table 4.

¹⁹ Lower than the monitoring limit 0.031 $\mu\text{g/L}$

²⁰ Lower than the monitoring limit 0.012 $\mu\text{g/L}$

²¹ Lower than the monitoring limit 0.017 $\mu\text{g/L}$

²² Lower than the monitoring limit 0.028 $\mu\text{g/L}$

²³ Lower than the monitoring limit 0.033 $\mu\text{g/L}$

Table 4. Results of the Studies Conducted by Academic Institutions in 1997 and 1999 on POPs in Sediments of Inner Harbor of Macao and the Adjacent Seawaters²⁴

POPs	Range of Concentration ($\mu\text{g}/\text{kg}$, dry weight)
PCBs	12.51 ~ 338.53
DDT	3.60 ~ 1628.81

2. Research results of 2001

The research aimed to analyze the organochlorine pesticides in water bodies of inner harbor of Macao and adjacent seawaters. The analysis involved five POPs under the Convention, i.e., DDT, Heptachlor, Aldrin, Dieldrin and Endrin. The results are shown in Table 5.

Table 5. Results of the Study Conducted by Academic Institutions in 2001 on POPs in Water Bodies of Inner Harbor of Macao and the Adjacent Seawaters²⁵

POPs	Range of Concentration (ng/L)
DDT	8.66 – 29.76
Heptachlor	0.44 – 1.52
Aldrin	1.73 – 5.14
Dieldrin	0.16 – 1.48
Endrin	0.31 – 4.80

2.3.8 Basic technical forces on POPs assessment, management, research, investigation, monitoring and analysis

At present, there are no local institutions or academic agencies in Macao possessing technical capacity or conditions strong enough to conduct assessment, management, research, investigation, monitoring or analysis of POPs. Meanwhile, the official testing organs and laboratories of private sectors are incapable of analyzing all the 12 POPs under the Convention.

2.3.9 Status of population and the environment affected by POPs as well as the impacts imposed by POPs on public health, environmental quality and relevant workers and groups

Considering that Macao has quite limited data on POPs and lacks systematic studies and evaluation in this field, the authority currently is unable to assess the extent and scope of the effects of POPs on residents and the environment of Macao.

2.3.10 Status quo of to what extent the public and social groups recognize POPs issue as well as relevant dissemination and education efforts

Relevant surveys and evaluation programs concerning to what extent the public and social groups recognize POPs issue have not been carried out yet. In terms of publicity on

²⁴ Sources: *Study Reports on Environmental and Urban Development in Macao*, 1999

²⁵ Sources: *Study Reports on Environmental and Urban Development in Macao*, 2002

POPs, brief introductions are available to citizens mainly through general lectures on environmental education at current stage.

2.3.11 Regulatory system for chemicals in-use in Macao, including evaluation mechanism, new mechanisms and other relevant regulations

Currently *Foreign Trade Law* and the instructions of the Chief Executive are regulating chemicals import in Macao, while *Act on Medicine Registration Control* regulates the registration of medicines. However, no specific regulatory instruments are available for the administration of the manufacture, use, storage and release of chemicals.

In the current chemicals regulatory system, for new mechanisms imposed on regulated articles, the Chief Executive of Macao Special Administrative Region may, in accordance with relevant considerations, including safeguarding human life, health or security, protecting the environment and implementing the duties under the international legal instruments that binds Macao Special Administrative Region, forbid, restrict or set conditions for the import, export and transfer of the articles in question.

III. Strategy to Perform the Implementation Plans as Well as the Capacity Building and Priorities to Implement the Convention

3.1 Guidelines and policies for implementation

The Government of Macao Special Administrative Region will be dedicated to implementing the duties and provisions of *Stockholm Convention on Persistent Organic Pollutants*, and protect Macao residents' health and the environment from POPs, so as to support the administration goals to promote urban sustainable development and gradually raise comprehensive living standards of Macao residents.

3.2 Objectives of implementation plans

1. To improve the systems and mechanisms for POPs management;
2. To improve the laws and regulations on POPs elimination and control;
3. To establish detailed data inventory and database on POPs in Macao;
4. Sustained publicity, public awareness and education activities;
5. To finally eliminate or reduce the use and release of POPs, safeguard residents' health and protect the environment.

3.3 Strategy for the implementation plans

Macao has limited local data on POPs, therefore, it is somewhat difficult to work out specific action plans to control and eliminate the use and release of POPs suitable for local conditions at current stage. The relevant implementation plans are undertaken at two phases. The first phase focuses on preparing the mechanism to implement the Convention, designating implementation bodies and collecting detailed information on the status of POPs in Macao. In the second phase, efforts will concentrate on further drawing specific relevant action plan based on the information obtained during the first phase. The tasks at the two phases as well as the priorities are as follows:

3.3.1 The first phase

1. Work out relevant mechanisms to implement the Convention, ascertain the implementation bodies, make overall planning and coordinate relevant work for implementation;
2. Enact law to prohibit or control the import, export and transfer of chemicals listed in Annex A and Annex B of the Convention;
3. Gradually carry out systematic investigations and studies on the status of POPs in Macao;
4. Control the emission of new sources of unintentional release of POPs;
5. Gradually establish data collection mechanisms and database for POPs in Macao;
6. Launch publicity and education campaigns for POPs and raise the awareness of the citizens on POPs.

3.3.2 The second phase

1. Work out specific action plans to eliminate and control POPs used as pesticides, PCBs, DDT as well as the unintentional production and release of POPs on the basis of data and analysis results arising from the investigation and researches in the first phase;
2. Continuous efforts in publicity, raising public awareness and education;
3. Undertake relevant action plans on researches, development and monitoring;
4. Regularly deliver reports for evaluation of effectiveness in implementing the Convention.

3.4 Relevant capacity building for implementing the Convention and the priorities

Taking into account the practical circumstances in Macao, efforts should be made to improve and enhance the capacity building of the following aspects, so as to implement in full the duties and provisions of the Convention and accomplish the objectives of the implementation plans.

1. To develop the mechanisms to implement the Convention, identify the implementation body and make overall planning for the implementation work;
2. To improve the existing regulations on import and export of POPs;
3. To establish the data collection mechanism and database;
4. To undertake the investigation and studies on POPs in Macao and implement relevant plans;
5. To strengthen the technical forces on research, development and monitoring of POPs in Macao, enhance the trainings on personnel and set up a necessary supporting network;
6. Appropriate financial appropriation or fiscal assistance.

IV. Action Plans for the Implementation of the Convention

4.1 Action plans of the first phase

4.1.1 Develop relevant mechanism to implement the Convention and identify implementation body

For the moment, Macao has no specific mechanisms or implementation (executive) body for the implementation of *Stockholm Convention*. Therefore, in order to facilitate the successful implementation of relevant conventions and ensure that relevant provisions and duties under the Convention can be implemented effectively, the first priority of the first phase is to work out specific mechanism for the implementation of the Convention and ascertain implementation body.

Table 6. Action Plan for Formulating Relevant Mechanisms and Designating Executive Body for the Implementation of the Convention

Item	Goal	Details	Relevant executive bodies	Capital and funding source	Implementation duration
1.	To work out the mechanisms and designate executive body for the implementation of the Convention	To formulate specific mechanisms and designate executive body so as to carry out relevant work on Convention implementation as soon as possible	Decision-making bodies of Macao Special Administrative Region	-	From the entry into force of the Convention to 2010

4.1.2 Develop laws to forbid or control the import, export and transfer of POPs

On the basis of existing regulations on import and export, relevant regulations shall be worked out, which shall add the 12 POPs under the Convention onto the list of regulated goods, for the purpose of supervising the import, export and transfer of relevant chemicals and goods that contain such chemicals.

Table 7. Action Plans of Enacting Laws to Forbid or Control the Import, Export and Transfer of POPs

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	In accordance with Paragraph 1 (a) of Article 3, regulate the import, export and transfer of POPs listed in Annex A and Annex B of the Convention	On the current legal basis, add POPs listed in Annex A and Annex B of the Convention onto the list of regulated goods in accordance with <i>Law on Foreign Trade</i> .	Legal Affairs Bureau, Macao Economic Services, Department of Health, Macao Customs Service, Environment Council	Human resources for legislation	From the entry into force to 2010

2.		Develop relevant regulations to regulate POPs or goods with POPs that are carried by hand or as carry-on luggage of individuals with the excuse of personal uses or consumption	Legal Affairs Bureau, Macao Economic Services, Department of Health, Macao Customs Service, Environment Council		
3.		Referring to existing licensing system and medicine registration system, and considering the provisions of <i>Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes</i> , develop systems for the import and export registration, review and licenses of goods, equipment and wastes that contain POPs.	Legal Affairs Bureau, Macao Economic Services, Department of Health, Macao Customs Service, Environment Council		
4.		Revise the existing 'Classification Table/Coordination System of Goods for Foreign Trade in Macao (the 3 rd edition)' (HS2002), and compile separate codes for POPs regulated by the Convention, so as to collect exact import and export data and supervise the import and export situation of POPs.	Statistic and Census Service		

4.1.3 Gradually carry out systematic surveys and evaluation of POPs in Macao

Systematic surveys and studies shall be undertaken on the status of POPs in Macao, including the production, use, storage and release, in-service equipment that contain POPs, waste materials or wastes with POPs as well as the content of POPs in the environment, food and human body. Relevant information shall be mastered exactly, while the findings will serve as important reference to the development of further plans for POPs elimination and control.

4.1.3.1 Surveys and evaluation of basic situation of PCBs in Macao

Table 8. Action Plans for Surveys and Evaluation of Basic Situation of PCBs

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
------	------	---------	---------------------------	-----------------------------	-------------------------

1.	Collect data on the production, use and storage of PCBs in Macao, on the quantity of in-service equipment that contain PCBs as well as PCBs levels.	To undertake surveys on relevant enterprises and industrial sites in Macao, identify and mark equipment that contain PCBs, in particular, in-service equipment with PCBs level above 10% and capacity more than 5L, in-service equipment with PCBs level above 0.05% and capacity more than 5L, in-service equipment with PCBs level above 0.005% and capacity more than 0.05L, and other articles with PCBs level over 0.005%.	Macao Economic Services, Statistic and Census Service, Environment Council and other relevant departments	It is estimated that MOP 4 million is to be invested in it, and technical supports are needed.	From the entry into force of the Convention to 2010
2.	Collect data on environmental distribution of PCBs as well as PCBs levels in human body and foods, so as to evaluate risks and impact degrees	Gradually conduct systematic research, survey and monitoring of PCBs levels in the environment in Macao, and collect data on PCBs levels and distribution in water bodies, air, sediments, soils and organisms. Meanwhile, undertake appropriate studies and supervision on PCBs in foods and their impacts on human health.	Department of Health, Environment Council and other relevant agencies		

4.1.3.2 Surveys and evaluation of basic information on unintentional release of POPs in Macao

Table 9. Action Plans for Surveys and Evaluation of Basic Information on Unintentional Release of POPs

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	In accordance with Article 5 of the Convention, conduct investigations and evaluation on pollutant sources and release amount in Macao	Investigate relevant pollutant sources, work out a list of pollutant sources and estimate the release amount	Environment Council and other relevant agencies	It is estimated that MOP 7 million is to be invested in this, and relevant technical supports are of necessity.	From entry into force of the Convention to 2010

2.	Collect data on environmental distribution of POPs, POPs levels in human body and foods by unintentional releases, so as to evaluate the risks and impact degree.	Carry out systematic investigations and monitoring of unintentional release of POPs, collect data on the POPs levels and their distribution in water bodies, air, sediments, soils and organisms. At the same time, carry out appropriate studies and supervision on the levels in food and their impact on human health.	Department of Health, Environment Council and other relevant agencies		
----	-------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------	--	--

4.1.3.3 Surveys and evaluation of basic information on POPs (used as pesticides) in Annex A of the Convention in Macao

Table 10. Action Plans for the Surveys and Evaluation of Basic Information on POPs (Used as Pesticides) in Annex A of the Convention in Macao

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	Collect data on the production, use and storage of POPs used as pesticides in Macao as well as goods or wastes with such kinds of POPs.	Undertake surveys on relevant institutions, manufacturers, importers and pest control companies, so as to find out the exact quantity of POPs (used as pesticides) production, use and storage as well as that of the goods or wastes containing such kinds of POPs.	Macao Economic Services, Department of Health, Environment Council and other relevant agencies	It is estimated that MOP 4 million is to be invested and relevant technical supports are needed.	From the entry into force of the Convention to 2010
2.	Collect data on the environmental distribution of POPs (used as pesticides), as well as the levels in human body and foods, in order to access the risks and the degree of impacts	Carry out relevant investigations and monitoring plan in order to systematically collect data on levels and distribution of such POPs in water bodies, air, sediments, soils and organisms. Meanwhile, proper studies and supervision on the levels in foods and the impact on human health are conducted.	Department of Health, Environment Council and other relevant agencies		

4.1.3.4 Surveys and evaluation of basic information on DDT in Macao

Table 11. Action Plans for Surveys and Evaluation of Basic Information on DDT in Macao

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	Collect data on DDT production, use and storage as well as goods or wastes that contain DDT.	Carry out surveys on relevant institutions, manufacturers, importers and pest control companies so as to find out the exact quantity of DDT production, use and storage as well as that of goods or wastes that contain DDT in Macao.	Macao Economic Services, Department of Health, Environment Council and other relevant agencies	It is estimated that MOP 2 million is to be invested and relevant technical supports are needed.	From the entry into force of the Convention to 2010
2.	Collect data on environmental distribution of DDT and DDT levels in human bodies and foods, so as to evaluate the risks and degree of impact.	Carry out relevant investigations and monitoring plan in order to systematically collect data on DDT levels and distribution in water bodies, air, sediments, soils and organisms. Meanwhile, conduct proper studies and supervision on DDT levels in foods and the impact on human health.	Department of Health, Environment Council and other relevant agencies		

4.1.3.5 Surveys and evaluation of sites contaminated by POPs

Table 12. Action Plan for Surveys and Evaluation of Sites Contaminated by POPs

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	Collect data on sites that may be contaminated by POPs and conduct risks evaluation	In accordance with investigation and evaluation data of POPs, undertake surveys and risks evaluation on sites that may be contaminated by POPs.	Department of Health, Environment Council and other relevant agencies	It is estimated that MOP 2 million is to be invested and relevant technical supports are needed.	From the entry into force of the Convention to 2010

4.1.4 Control the emission of new sources of unintentional release of POPs

Table 13 Action Plan for controlling the emission of new sources of unintentional release of POPs

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	In accordance with (d) of Article 5 of the Convention,	The proposed extensions of the incineration plant and hazardous waste treatment centre will include state-of-the-art equipment to ensure that the emission of	Infrastructure Development Office and Environment Council	MOP 170 million is estimated for inputs.	From the entry into force of the Convention to 2008

	control the emission of new sources of unintentional release of POPs by using best available techniques.	Dioxins is below the designated standard of 0.1 ng-TEQ/Nm.			
--	----------------------------------------------------------------------------------------------------------	------------------------------------------------------------	--	--	--

4.1.5 Gradually establish data collection mechanism and database on POPs status in Macao

Macao has limited data on POPs, however, with the progress of relevant study and investigation plans as well as the deepening implementation of the Convention, abundant data and information on POPs will be available. Furthermore, in accordance with Article 15 of the Convention, the regular reports submitted by the Parties shall include detailed statistics on POPs. Therefore, sound data collection mechanisms and mature database are of great significance to the effective implementation of relevant provisions of the Convention and evaluation of the effectiveness.

Table 14. Action Plan for Establishing Data Collection Mechanism and Database

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	Improve data collection mechanism and establish relevant database	Establish data collection mechanism and database to gather data on POPs from all agencies, update the original data, collect and sort out the data on relevant studies and survey and gather other information related to POPs.	Macao Economic Services, Statistic and Census Service, Department of Health, Macao Customs Service Environment Council and other relevant agencies	It is estimated to need the inputs of MOP 2 million relevant human resources	From the entry into force of the Convention to 2010

4.1.6 Conduct initial campaigns on the publicity, awareness and education on POPs

Table 15. Action Plan for Initial Publicity Campaigns on Publicity, Awareness and Education on POPs

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	Observe the provisions and duties under Article 10 of the Convention	On the basis of existing environmental publicity and education, intensify the publicity on POPs, including printing dissemination materials and holding relevant lectures. In addition, strengthen the trainings of relevant personnel.	Department of Health, Environment Council and other relevant agencies	MOP one million is estimated for inputs.	From the entry into force of the Convention to 2010

4.2 Action Plans of the second phase

4.2.1 Develop specific action plans to eliminate and control PCBs, the unintentional production and release of POPs, POPs used as pesticides in Annex A of the Convention and DDT

On the basis of the data collected from the surveys and researches as well as the analysis results of the first phase, specific action plans shall be formulated to eliminate and control PCBs, unintentional production and release of POPs, POPs used as pesticides under Annex A of the Convention and DDT, so as to fulfill the duties and provisions of Article 3, Article 5 and Article 6 of the Convention.

Table 16. Action Plans to Eliminate and Control PCBs, the Unintentional Production and Release of POPs, POPs Used as Pesticides in Annex A of the Convention and DDT

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.		According to the survey and evaluation results of PCBs in Macao during the first phase and taking into account the practical circumstances in Macao, work out regulations, rules and relevant measures to eliminate or control the intentional production and use of PCBs.			
2.	Implement the provisions and duties under Article 3 of the Convention	According to the survey and evaluation results of POPs used as pesticides in Macao during the first phase and taking into account the practical circumstances in Macao, develop regulations, rules and relevant measures to eliminate or control the intentional production and use of such POPs listed in Annex A of the Convention.	Legal Affairs Bureau, Department of Health, Macao Economic Services, Statistic and Census Bureau, Environment Council and other relevant agencies	It is estimated that MOP 3 million ²⁶ and relevant technical supports are necessary inputs.	2010-2015
3.		According to the survey and evaluation results of DDT in Macao during the first phase and taking into account the practical circumstances in Macao, work out regulations, rules and relevant measures to eliminate or control the intentional production and use of DDT.			

²⁶ The estimated investment capital only covers the costs for working out relevant action plans, excluding the expenditure for further implementation.

4.	Implement the provisions and duties under Article 5 of the Convention	In accordance with the surveys and evaluation results on unintentional production and release of POPs in Macao during the first phase, and taking into account the practical circumstances in Macao, work out regulations, rules and relevant measures on unintentional production and release of POPs listed in Annex C of the Convention.	Environment Council, Macao Economic Services and other relevant agencies		
5.	Implement the provisions and duties under Article 6 of the Convention	In accordance with the surveys and evaluation results on POPs in Macao, taking into consideration the practical circumstances in Macao and in cooperation with Basel Convention, develop regulations, rules or relevant measures on the storage of 12 kinds of POPs under the Convention as well as wastes with such POPs.	Macao Economic Services, Department of Health, Macao Customs Service, Environment Council and other relevant agencies		
6.	Manage and restore the contaminated sites and mitigate the risks of resident exposures	In accordance with the surveys and evaluation results of the first phase on sites contaminated by POPs, develop further regulations or relevant measures concerning the management and restoration of contaminated sites.	Department of Health, Environment Council and other relevant agencies		

4.2.2 Strategy and action plans for sustained publicity, public awareness and education

On the basis of publicity and education activities during the first phase and taking into account the practical circumstances of POPs in Macao, efforts will be made to work out long-term publicity strategies and to launch continuous publicity and education campaigns in order to raise public awareness in POPs.

Table 17. Action Plans for Formulating Strategies on Sustained Publicity, Public Awareness and Education

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	Implement the provisions and duties under Article 10 of the Convention	Based on the publicity and education plan in the first phase and taking the practical circumstances of POPs in Macao, work out the mechanism to communicate with relevant groups as well as long-term publicity strategy.	Department of Health, Environment Council and other relevant agencies	MOP one million is estimated for inputs.	2010-2015
2.		Publicity and education campaigns in the second phase			

4.2.3 Action plan for relevant studies, development and monitoring

On the basis of the action plan for studies and surveys in the first phase, other relevant study, development and monitoring projects are carried out gradually.

Table 18. Action Plan for Relevant Studies, Developments and Monitoring

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	Implement the provisions and duties under Article 11 of the Convention	Within the scientific research capacity of Macao and on the basis of the action plan for studies and surveys in the first phase, gradually carry out other relevant studies, development and monitoring projects, among others, the monitoring of POPs sources and its release into the environment in Macao, the existence, levels and developing trends of POPs in the environment as well as the monitoring of and impact assessment on human health and the environment.	Environment Council, Department of Health and other relevant agencies	It is estimated that MOP 10 million ²⁷ and relevant technical supports are necessary inputs.	2010-2015

4.2.4 Submitting reports and the mechanism to evaluate the effectiveness of the implementation of the Convention

Macao Special Administrative Region shall, according to the schedule set by the Central Government of People's Republic of China, submit regular reports to relevant authorities and evaluate the effectiveness of the implementation of the Convention.

Table 19. Action Plans for Reports Submission and the Mechanism to Evaluate the Effectiveness of Implementing the Convention

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	Implement the provisions and duties under Article 15 of the Convention	Macao Special Administrative Region shall, according to the arrangement of the Central Government of the People's Republic of China, submit regular report on the implementation of the Convention to relevant authorities.	Organs concerning the implementation of the Convention	MOP one million is estimated for inputs.	According to the schedule set by the Central Government of People's Republic of China

²⁷ The estimated inputs are only for the costs of purchasing apparatus and equipments as well as establishing monitoring system at the initial phase, excluding the expenditure of future operations.

2.	Implement the provisions and duties under Article 16 of the Convention	Macao Special Administrative Region shall, according to the arrangements of the Central Government of the People's Republic of China, periodically evaluate the effectiveness of implementing the Convention.	Organs concerning the implementation of the Convention		
----	------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------	--	--

4.2.5 Assess technical assistance and funding mechanism

Currently, Macao has insufficient technical capacity to study and analyze the POPs listed in the Convention, so technical supports from relevant institutions are needed in the initial efforts to implement the Convention. Furthermore, Macao shall, in accordance with relevant provisions, assess the necessity to apply for fiscal supports from relevant entities.

Table 20. Action Plans for Assessing Technical Assistance and the Funding Mechanism

Item	Goal	Details	Relevant executive bodies	Capital and funding sources	Implementation duration
1.	In accordance with Article 12 of the Convention, seek for relevant technical assistance.	Macao has insufficient technical capacity to study, monitor and analyze POPs, so Macao shall consider seeking technical assistance from other places or relevant agencies when implementing specific provisions and duties under the Convention.	Organs concerning the implementation of the Convention	-	2010-2015
2.	According to Article 13 of the Convention and taking into account the practical needs, assess the necessity of seeking financial assistance.	The implementation of <i>Stockholm Convention</i> involves a wide range of areas and requires strong technical capacity. Meanwhile, Macao has limited data on POPs, therefore, it is hard to exactly evaluate the financial inputs and fiscal burdens. However, Macao may, in accordance with relevant provisions and practical needs, assess the necessity to apply for fiscal supports from relevant entities.	Organs concerning the implementation of the Convention	-	

V. Fiscal Expenditure and Relevant Financial Arrangement

For the next ten years, in order to implement the action plan in the first and second phases, Macao Special Administrative Region shall invest an initially estimated capital input of MOP 207 million or so, which will add the financial burdens to Macao to some extent. However, abundant financial resources are important to the effective implementation of the Convention. Therefore, the Government of Macao Special Administrative Region shall, within its capacities and taking into account practical circumstances, make relevant budgets. In addition, the Government of Macao Special Administrative Region shall, in accordance with relevant provisions and referring to Article 13 of the Convention, assess

the necessity to apply for financial support from relevant entities, in order to ensure that the implementation work has sufficient financial resources and relevant supports.

Table 21. Initial Estimation of Inputs in the Implementation of the Convention

Action Plan of the First Phase				
Action plan	Title	Chapters and paragraphs involved in the plan	Estimated capital inputs (MOP 10,000)	Implementation duration
1	Work out relevant mechanism for implementing the Convention and designate executive bodies	4.1.1	-	From the entry into force of the Convention to 2010
2	Legislation to forbid or control the import, export and transfer of POPs	4.1.2	-	
3	Investigation and evaluation on basic information of PCBs in Macao	4.1.3.1	400	
4	Investigation and evaluation on basic information of unintentional release of POPs in Macao	4.1.3.2	700	
5	Investigation and evaluation on basic information of POPs used as pesticides in Annex A of the Convention	4.1.3.3	400	
6	Investigation and evaluation on basic information of DDT in Macao	4.1.3.4	200	
7	Investigation and evaluation on sites contaminated by POPs	4.1.3.5	200	
8	Control the emission of new sources of unintentional release of POPs	4.1.4	17,000	From the entry into force of the Convention to 2008
9	Gradual establishment of data collection mechanism and database on POPs in Macao	4.1.5	200	From the entry into force of the Convention to 2010
10	Publicity campaigns on POPs, public awareness and education	4.1.6	100	
Estimated capital inputs for the action plan in the first phase			19,200	
Action Plan of the Second Phase				
1	Work out specific action plans to eliminate and control PCBs, the unintentional production and release of POPs, POPs used as pesticides under Annex A of the Convention and DDT.	4.2.1	300	2010-2015
2	Strategies and action plans for sustained publicity, public awareness and education	4.2.2	100	
3	Action plans for relevant studies, development and monitoring	4.2.3	1,000	
4	Reports submission and the mechanism to evaluate the effectiveness of implementing the Convention	4.2.4	100	
5	Mechanism for assessment of technical assistance and funding resources	4.2.5	-	
Estimated capital inputs for the action plan in the second phase			1,500	
Estimated total capital inputs			20,700	