Hong Kong Special Administrative Region Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs)

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Environmental Protection Department
The Government of the Hong Kong Special Administrative Region

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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

NOx	Nitrogen oxide
NPC	National People's Congress
OC	Organochlorine
OCP	Organochlorine pesticides
PCB	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzo-*para*-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 km^2, 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 km^2 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 transhipment 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
Economic Development and Labour Bureau		
Labour Department	• Control the manufacture, process or work involving certain specified hazardous chemicals (such as carcinogenic substances) to protect workers' safety	• Factories and Industrial Undertakings Ordinance (Cap 59) • Occupational Safety and Health Ordinance (Cap 509)
Marine Department	• 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	• Merchant Shipping (Prevention and Control of Pollution) Ordinance (Cap 413) • Merchant Shipping (Safety) Ordinance (Cap 369)
Environment, Transport and Works Bureau		
Drainage Services Department	• 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	• 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	• 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	• 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
Financial Services and Treasury Bureau		
Census and Statistics Department	• Maintain a database of vital statistics to facilitate research, planning and decision–making within the Government and in the community	
Health, Welfare and Food Bureau		
Agriculture, Fisheries and Conservation Department	• 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	• Pesticides Ordinance (Cap 133) • Import and Export Ordinance (Cap 60)
Department of Health	• 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	• Ensure food safety through food surveillance and certification, conduct dietary risk assessment and risk communication and advice on food safety standards	• Public Health and Municipal Services Ordinance (Cap 132)
Government Laboratory	• 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	
Security Bureau		
Customs and Excise Department	• Control the import and export of commodities and certain prohibited articles by air, land, and sea.	• Import and Export Ordinance (Cap 60)
Fire Services Department	• Control the manufacture, labelling, packaging, storage, transport (on land and at sea) and use of dangerous goods (including corrosive, flammable and poisonous substances, etc)	• 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 oversea 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)	Transhipment (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) • *power plants / power stations* • *railway / mass transit railway*	13	0	0
High voltage capacitor (no. of units) • *factories / old buildings*	830	303	191
High voltage capacitor in use (no. of units) • *Industries* • *Dockyard* • *Hospital* • *Estate management*			85 *27* *48* *3* *7*
High voltage capacitor stockpile (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 Statistic 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 †
		Air	Water	Land	Products	Residues	(g TEQ/a)
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
	Coal fired power boilers (pulverized fuel power plants with EP of 99% removal efficiency)	*1.182*				*3.692*	
	Heavy fuel fired power boilers (pulverized fuel/fuel oil fired power plants with EP of 99% removal efficiency)	*0.005*					
	Light fuel oil/Natural gas fired power boilers (natural gas fired plants, combined cycle gas turbine)	*0.027*					
	Landfill and biogas combustion	0.037					0.037
	Biogas-fired boilers, motors/turbines and flaring	*0.037*					
	Domesting heating - Fossil fuels	0.298					0.298
	Coal fired stoves	*0.017*				*ND*	
	Oil fired stoves	*0.231*					
	Natural gas fired stoves	*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
	Unleaded fuel without catalyst	*0.002*					
	Unleaded fuel with catalyst						
	2-Stroke engines	0.0004					0.0004
	Unleaded fuel without catalyst	*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
	Forest fires	*0.030*		*0.024*			
	Grassland and moor fires	*0.030*		*0.024*			
	Fires, waste burning, landfill fires, industrial fires, accidental fires	0.251				0.213	0.464
	Accidental fires in houses, factories	*0.204*				*0.204*	
	Accidental fires in vehicles (per vehicle)	*0.046*				*0.009*	
	Open burning of wood (construction/demolition)	*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
	No control plants (old plants in service for >20 years)	*0.219*					
	Medium control plants (modest pollution control incorporated in furnace design)	*0.127*				*0.040*	
	Optimal control plants (advanced furnace design with combustion control and exhaust cleaning equipment)	*0.000*				*0.025*	
	Dry cleaning residues					0.0009	
	Tobacco smoking	0.0004					0.0004
	Cigar	*0.000*					
	Cigarette	*0.000*					
9.	**Disposal/Landfill**	**0.000**	**0.855**	**0.000**	**0.062**	**4.895**	**5.812**
	Landfill leachate		0.005				0.005
	Non-hazardous waste		*0.005*				
	Sewage/sewage treatment		0.850			4.895	5.745
	Sewage - Mixed industrial, commercial and domestic		*0.850*				
	· *No sludge removal*		*0.790*				
	· *With sludge removal*		*0.060*				
	Sludge - Mixed industrial, commercial and domestic					*4.895*	
	· *CEPT*					*3.603*	
	· *Secondary treatment*					*1.291*	
	Composting				0.062		0.062
	Livestock wastes				*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

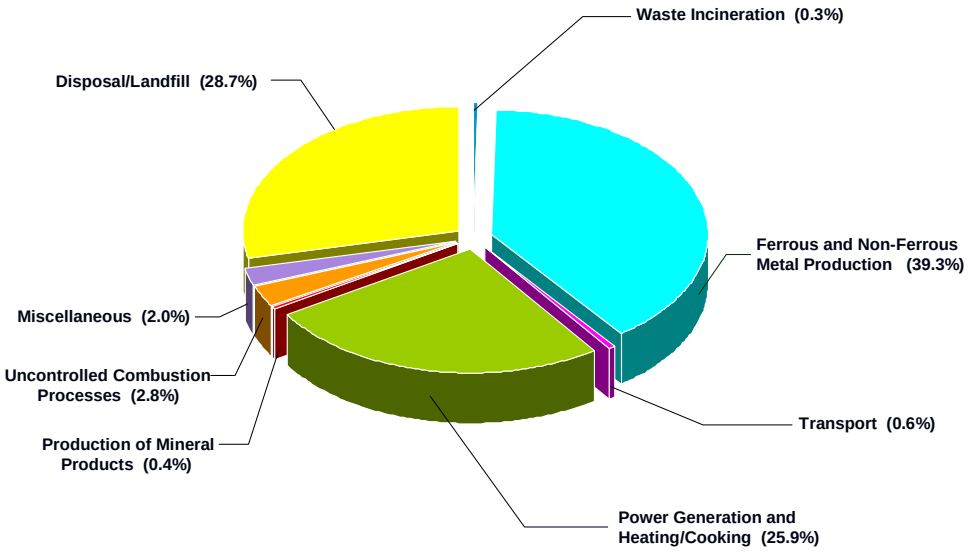
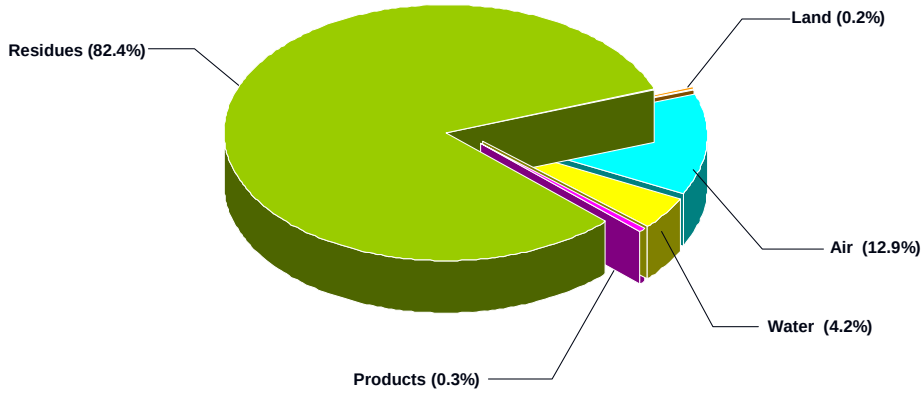


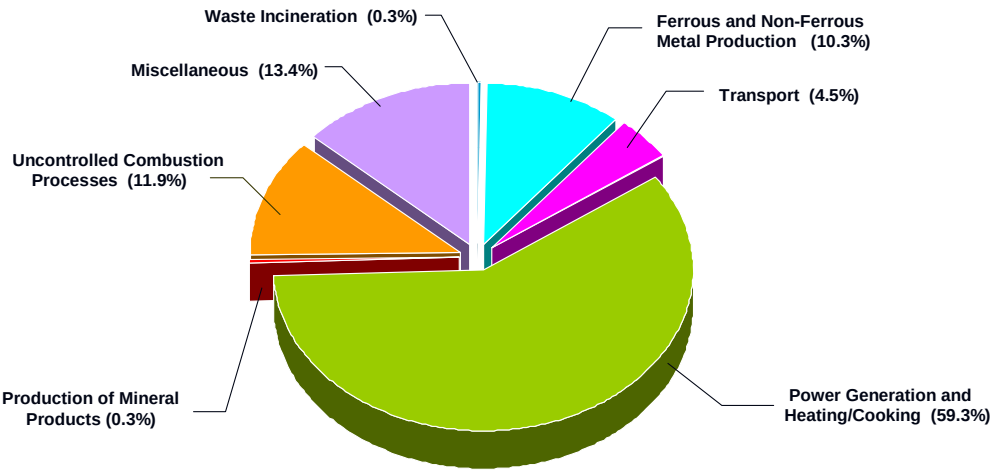
Figure 2 – Percentage of Dioxin/Furan Emission on a Vector Basis



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.

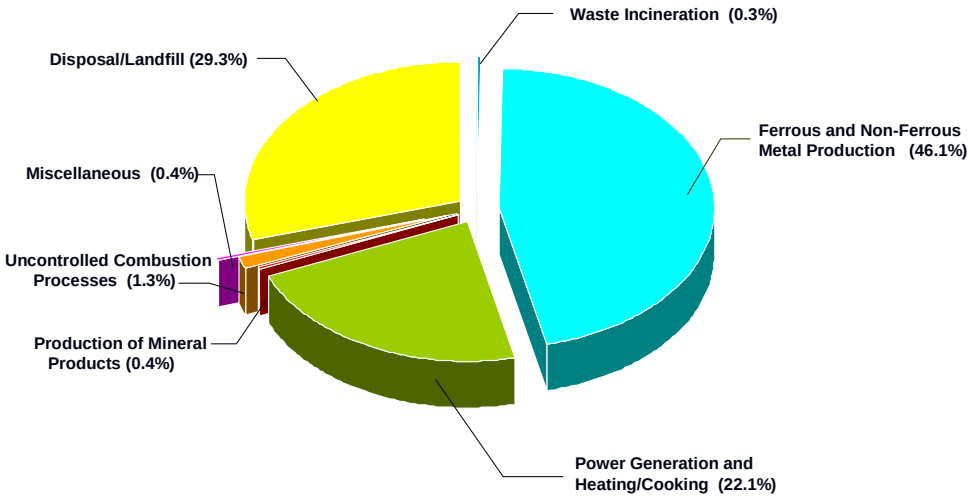
Release of Dioxins/Furans in Products

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), quintozene (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/m^3; 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/m^3; 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/m^3 and 0.06 pg I-TEQ/m^3, 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/m^3), heptachlor (0.03 ng/m^3) and HCB (0.16 ng/m^3) 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 patters (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 Jordon, 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/m^3 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/m^3. 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/m^3 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/m^3. The HKSARG has not set ambient air quality standard for dioxins/furans. The mean dioxin/furan concentration of 0.06 pg I-TEQ/m^3 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)
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)

Action Item	Anticipated Outcome	Responsible Party	Priority/ Target Term
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 4th 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 (NOx), and the associated vehicular dioxins/ furans to the local atmosphere.	EPD	Short-term (<5 yr)
Emission of Dioxins/Furans to the Marine Environment			
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)

Action Item	Anticipated Outcome	Responsible Party	Target Term
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)
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
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

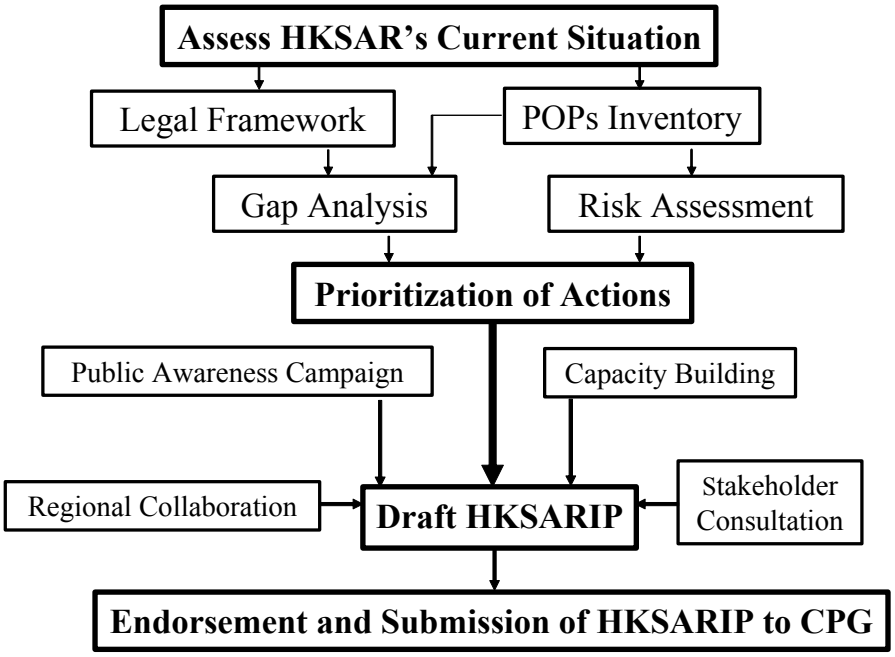
1. The POPs Unit in EPD

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).

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Annex 3 Survey on Import, Export, Domestic Production and Use of Non-pesticide 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.

Appendix A

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

Appendix B

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。爲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 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): _____

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。

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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					Year 年份	**Import** 入口	**Export** 出口
1.	**Polybrominated Biphenyls (PBB) *** **多溴聯苯**	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					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) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					2000		
					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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					Year 年份	**Import** 入口	**Export** 出口
3.	**Polychlorinated Terphenyls (PCT) *** **多氯三聯苯**	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					2000		
					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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					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) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					2000		
					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, 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.

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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					Year 年份	**Import** 入口	**Export** 出口
5.	**Hexachloro-benzene *** 六氯代苯	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					2000		
					2001		
					2002		
					2003		

* *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.

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

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					Year 年份	**Import** 入口	**Export** 出口
6.	**Tetramethyl lead*** 四甲基鉛	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					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) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					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
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					Year 年份	**Import** 入口	**Export** 出口
8.	**Crocidolite *** 青石棉 **Other name: Blue asbestos**	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					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.

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	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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					Year 年份	**Import** 入口	**Export** 出口
9.	**Amosite *** 鐵石棉 **Other name: Brown asbestos Mysorite.**	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					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
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	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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					Year 年份	**Import** 入口	**Export** 出口
10.	**Anthophyllite *** 直閃石 **Other name: Anthophyllite asbestos, Azbolen asbestos.**	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					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
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					Year 年份	**Import** 入口	**Export** 出口
11.	**Actinolite *** 陽起石 **Other name: Actinolite asbestos**.	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					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) **If yes, how? (e.g. as raw material)** 若有，作什麼用途？(例：原料)	**Approximate cost (HK$/tonne)** 大約價值(港元/公噸)	**Import and Export (tonne/yr)** 出入口 (公噸/年)		
					Year 年份	**Import** 入口	**Export** 出口
12.	**Tremolite *** 透閃石 **Other name: Tremolite asbestos.**	Yes/No (有/沒有)	Yes/No (有/沒有) Raw-material/intermediate/solvent/ end product/others (please specify) 原料/中介物/溶劑/製成品 /其他(請註明)		1999		
					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

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.

Appendix A

本署檔號
OUR REF: EP1030/C1//1 III ( )
來函檔號
YOUR REF:
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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.

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

Reply Form*

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

* **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.**

Appendix B

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

	Organization	No. of Stakeholders Attended
	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**

Appendix D

Details of Stakeholders' Feedback and Government's Responses at the Workshop

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
1. POPs Inventory		
Academia	● 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.	● EPD appreciated the stakeholders' comments and suggestions.
	● 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.	● 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
	● 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.	● 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.
	● 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.	● 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.
	● 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?	● 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	● 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?	● 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.
	● Requested further information on the estimate of HCB release as an unintentional by-product.	● 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	● 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.	● EPD appreciated stakeholders' comments and their active participation in the preparation of the draft HKSARIP.

STAKEHOLDER GROUP	FEEDBACK FROM STAKEHOLDERS	RESPONSE FROM THE GOVERNMENT
	● 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.	● 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.
	● 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.	● 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.
	● 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.	● 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.
	● Clarification requested on whether there would be any emission control on dioxin-like PCBs release due to incineration.	● 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
	• Clarification requested on whether a central incineration facility (CIF) being proposed would have significant contribution to dioxin release into the air.	• 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.
Business Associations and Companies	• 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.	• 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	• 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.	• 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.
	• 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.	• 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
	• 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.	• 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	• 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}.	• 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
	● 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.	● 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.
	● In making environmental and human health risk assessments, suggested that the Government consider strengthening collaboration with the local academia who possessed the necessary expertise.	● 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	● 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.	● 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
	• 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.	• 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	• 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.	• 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
	• 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.	• 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.
	• 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.	• EPD noted the study findings with interest.
	• 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.	• 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	● 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.	● 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.
	● Commented that POPs levels should be frequently monitored especially during and after major pollution incidents.	● 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	● 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.	● 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
	• 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.	• AFCD 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	• 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.	• EPD responded that the Government would keep in view the stakeholder's suggestions in future planning.

Appendix E

Details of Stakeholder's Written Feedback

GREEN COUNCIL
環保促進會

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

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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
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will results 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.