

Introduction to the new POPs listed under the Stockholm Convention

Identity, past/present uses, alternatives, and obligations under the Convention



Outline of the presentation

- Introduction to the 9 new POPs listed in 2009
- Overview of the 9 new POPs and challenges:
 - Pesticides
 - Industrial chemicals
 - Chemicals from unintentional production
- The newest of the POPs: endosulfan
- Guidance available on the 9 new POPs
- Guidance under development

9 new POPs (added to the Convention in May 2009)

Chemical	Pesticides	Industrial chemicals	Unintentional production	Annex
Chlordecone	+			A
Lindane	+			A
Alpha hexachlorocyclohexane	+		By-product of lindane	A
Beta hexachlorocyclohexane	+		By-product of lindane	A
Commercial pentabromodiphenyl ether		+		A
Commercial octabromodiphenyl ether		+		A
Hexabromobiphenyl		+		A
Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride	+	+		B
Pentachlorobenzene			+	C

Annexes to the Convention

Annex A (Elimination)

Each Party shall prohibit and/or take the legal and administrative measures necessary to eliminate its production and use of chemicals in Annex A subject to the provisions of that Annex

Annex B (Restriction)

Each Party shall restrict its production and use of chemicals in Annex B in accordance with the provisions of that Annex

Annex C (Continuing minimization)

Each Party shall take measures to reduce the total releases derived from anthropogenic sources of each of the chemicals listed in Annex C, with the goal of their continuing minimization and, where feasible, ultimate elimination

Goods regulated by the Convention

- A listed POP as a chemical substance
- A mixture produced by intentionally adding a listed POP
- An article produced by intentionally adding a listed POP

For POPs listed in Annex A or B:

- A non POP chemical that due to its production contains a listed POP unintentionally as a contaminant in a concentration higher than a trace contaminant
- A mixture produced by intentionally adding a non POP chemical that due to its production contains a listed POP unintentionally as a contaminant in a concentration higher than a trace
- An article produced by intentionally adding a non POP chemical that due to its production contains a listed POP unintentionally as a contaminant in a concentration higher than a trace

PESTICIDES

Chlordecone

- Proposal: 2005, European Community
- Risk profile: UNEP/POPS/POPRC.2/17/Add.1
- Risk management evaluation: UNEP/POPS/POPRC.3/20/Add.1



Past use: Agricultural pesticide (banana plantation)
Used in 1966-1975 in the USA for ant and roach.
Also known as « Kepon ».
Properties similar to Mirex.

Currently: No production and use reported.
The French island of Martinique is heavily contaminated with chlordecone.



Alternatives: Available

- Listed in: **Annex A (Elimination)**
- Production: **Total ban - No exemption**
- Use: **Total ban - No exemption**

Lindane

- Proposal: 2005, Mexico
- Risk profile: UNEP/POPS/POPRC.2/17/Add.4
- Risk management evaluation: UNEP/POPS/POPRC.3/20/Add.4



Past use: About 600,000 tons of lindane was used globally 1950-2000 as pesticide and veterinary and human applications

Currently: Some countries are still known to use lindane (e.g. for seed dressing, control of termites, head lice)

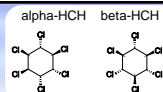
Alternatives: Exists but not readily available in some countries especially for control of head lice and scabies

- Listed in: **Annex A (Elimination)**
- Production: **Total ban - No exemption**
- Use: **Specific exemption: Human health pharmaceutical for control of head lice and scabies as second line treatment**
- Possible additional control measures:
 - Limiting the package size; appropriate label
 - Protecting vulnerable groups;
 - Outreach and awareness; promoting alternatives



Alpha-Hexachlorohexane Beta-Hexachlorohexane

- Proposal: 2006, Mexico
- Risk profile: UNEP/POPS/POPRC.3/20/Add.8 and Add.9
- Risk management evaluation: UNEP/POPS/POPRC.4/15/Add.3 and Add.4



Past use: High-volume by-products of lindane. The production of one ton of lindane generates approximately up to 8 tons of mainly alpha- and beta-HCH.

Currently: Large stockpiles of alpha- and beta-HCH and contaminated sites around former lindane production sites exist.

Alternatives: As there is no commercial use of alpha- alternatives are not needed.

- Listed in: **Annex A (Elimination)**
- Production: **Total ban - No exemption**
- Use: **Total ban - No exemption**



GLOBAL ISSUE for POPs pesticides: obsolete stockpiles

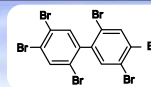


INDUSTRIAL CHEMICALS

- Flame retardants
- PFOS, its salts & PFOS-F

Hexabromobiphenyl

- Proposal: 2005, European Community
- Risk profile: UNEP/POPS/POPRC.2/17/Add.3
- Risk management evaluation: UNEP/POPS/POPRC.3/20/Add.3



Past use: Flame retardants. Added to plastics used in products such as home electrical appliances, textiles, plastic foams, laptop cabinets, etc. to make them difficult to burn.

Currently: No production and use reported.
Other polybrominated biphenyls are also controlled by RoHS Directive by EU.

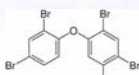
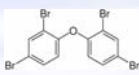
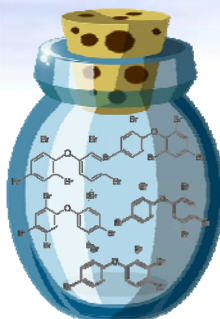
Alternatives: Available

- Listed in: **Annex A (Elimination)**
- Production: **Total ban - No exemption**
- Use: **Total ban - No exemption**



Tetrabromodiphenyl ether and pentabromodiphenyl ether

- Proposal: 2005, Norway
- Risk profile: UNEP/POPS/POPRC.2/17/Add.1
- Risk management evaluation: UNEP/POPS/POPRC.3/20/Add.1



Originally proposed as:
"Commercial mixture of pentabromodiphenyl ether"
Mixture of brominated organic chemicals, main components are penta- and tetra- isomers.

Tetrabromodiphenyl ether and pentabromodiphenyl ether

Past use: Most commonly used as an additive flame retardant in flexible polyurethane foam (PUF); also used in printed circuit boards. The annual demand worldwide was estimated as 7,500t in 2001 (US: 7,100t, Europe 150t, and Asia 150t)

Currently: There should be no current production of commercial pentaBDE in Europe, Japan, Canada, Australia, and the US; however, it is possible that production continues elsewhere in the world.

Alternatives: Some known alternatives e.g. triphenyl phosphate, tribromoneopentyl alcohol, tris(1,3-dichloro-2-propyl)phosphate
- Guidance on feasible flame-retardant alternatives to commercial pentabromodiphenyl ether (POPRC 2008)
- Environmental Profiles of Chemical Flame-Retardant Alternatives for Low-Density Polyurethane Foam (USEPA 2005)

Tetrabromodiphenyl ether and pentabromodiphenyl ether

DEFINITION

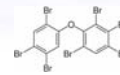
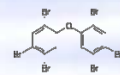
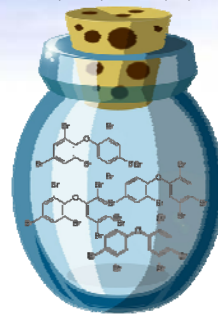
"Tetrabromodiphenyl ether and pentabromodiphenyl ether" means:

- 2,2',4,4'-tetrabromodiphenyl ether (BDE-47, CAS No: 40088-47-9) and
- 2,2',4,4',5-pentabromodiphenyl ether (BDE-99, CAS No: 32534-81-9) and
- other tetra- and pentabromodiphenyl ethers present in commercial pentabromodiphenyl ether.

- Listed in **Annex A (Elimination)**
- Production: **Total ban - No exemption**
- Use: **Total ban of use in new products and articles**
- Exemption for recycling of articles: **May allow recycling of articles that (may) contain the chemicals, and the use and final disposal of articles manufactured from recycled materials that (may) contain the chemicals**

Hexabromodiphenyl ether and heptabromodiphenyl ether

- Proposal: 2006, EU
- Risk profile: UNEP/POPS/POPRC.3/20/Add.6
- Risk management evaluation: UNEP/POPS/POPRC.4/15/Add.1



Originally proposed as:
"Commercial mixture of octabromodiphenyl ether"
Mixture of brominated organic chemicals, main components are hexa- and hepta-isomers.

Hexabromodiphenyl ether and heptabromodiphenyl ether

Past use: Most commonly used as an additive flame retardant in acrylonitrilebutadiene styrene (ABS) plastic. Other use: high impact polystyrene (HIPS), polybutylene terephthalate (PBT) and polyamide polymers. Manufacture of computers, home electronics, office equipment (plastic outer casings, printed circuit boards, internal plastic parts, components with rigid PUR).

Currently: Ceased in Europe, Japan, Canada, Australia, and the US; however, it is possible that production continues elsewhere in the world.

Alternatives: Available and already used in many developed countries.

Hexabromodiphenyl ether and heptabromodiphenyl ether

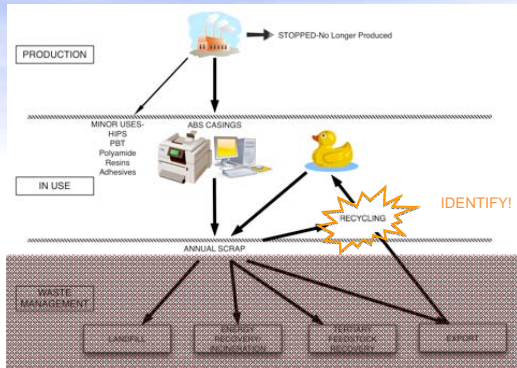
DEFINITION

"Hexabromodiphenyl ether and heptabromodiphenyl ether" means:

- 2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153, CAS No: 68631-49-2),
- 2,2',4,4',5,6'-hexabromodiphenyl ether (BDE-154, CAS No: 207122-15-4),
- 2,2',3,3',4,5',6 heptabromodiphenyl ether (BDE-175, CAS No: 446255-22-7),
- 2,2',3,4,4',5',6-heptabromodiphenyl ether (BDE-183, CAS No: 207122-16-5) and
- other hexa- and heptabromodiphenyl ethers present in commercial octabromodiphenyl ether.

- Listed in **Annex A (Elimination)**
- Production: **Total ban - No exemption**
- Use: **Total ban of use in new products and articles**
- Exemption for recycling of articles: **May allow recycling of articles that (may) contain the chemicals, and the use and final disposal of articles manufactured from recycled materials that (may) contain the chemicals**

Eliminating BDEs: main challenges



Key recommendations of POPRC on the recycling of BDEs adopted by COP 5 decision 5/5

Recommendations based on a study of the implications of recycling c-penta and c-octa BDEs

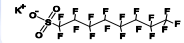
Eliminate BDEs from the recycling streams as swiftly as possible:

- Implement measures to allow screening and separation of material contaminated with BDEs from recycling stream
- Stop export of wastes containing BDEs except for their environmentally sound disposal
- Identify best available techniques and best environmental practices for the treatment of BDE wastes to prevent release of brominated dioxins and furans
- Minimise occupational exposure during recycling and waste disposal
- Understand extent of BDEs in recycling and waste streams in developing countries
- Transfer of screening and separation techniques to developing countries
- Avoid land filling of wastes containing BDEs

PFOS, its salts & PFOS-F

Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF)

- Proposal: 2005, Sweden
- Risk profile: UNEP/POPS/POPRC.2/17/Add.5
- Risk management evaluation: UNEP/POPS/POPRC.3/20/Add.5 and UNEP/POPS/POPRC.4/15/Add.6



Past use: Surfactant, water and fat repellent
PFOS is both intentionally produced and a degradation product of PFOS-related substances (PFOS precursors) in the environment. Examples of use include: electronic appliances, fire-fighting foams, metal plating, hydraulic fluids, insecticides, water proof for textile, leather, etc.

Currently: PFOS is still produced and used in several countries.

Alternatives: Available for some types of use but no known technically feasible alternatives for some applications e.g. semi-conductor, photo imaging, aviation hydraulic fluids
Guidance on alternatives to PFOS and its derivatives (POPRC 2011)

→ Listed in **Annex B (Restriction)** with **Specific exemptions and Acceptable purposes**

Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF): obligations

Regulated by Annex B are **PFOS, its salts, PFOSF and PFOS related chemicals**. PFOS related chemicals are chemicals that contain the structural element PFOS in their molecular structure as they are and were produced with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) as an intermediate or starting material

Specific exemptions and acceptable purposes available for production and use of PFOS, its salts, PFOSF and PFOS related chemicals

Examples of specific exemptions are:

- textiles and upholstery
- coatings and coating additives

Examples of acceptable purposes are:

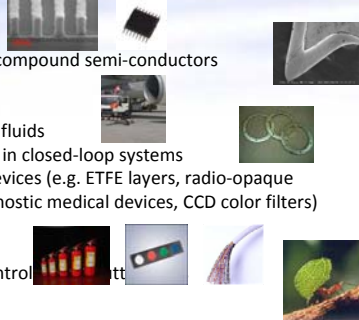
- photo-imaging
- aviation hydraulic fluids

Some past/current uses of PFOS



PFOS Use: Acceptable purposes (no alternatives)

- Photo imaging,
- Photo resist and anti-reflective coatings for semi-conductors
- Etching agent for compound semi-conductors and ceramic filters
- Aviation hydraulic fluids
- Metal plating only in closed-loop systems
- Certain medical devices (e.g. ETFE layers, radio-opaque ETFE, in vitro diagnostic medical devices, CCD color filters)
- Fire fighting foam
- Insect baits for control



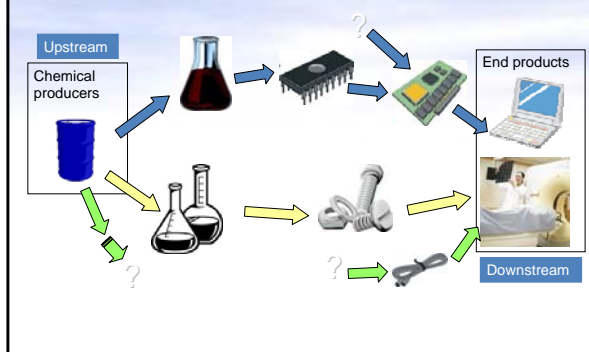
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PFOS Use: Specific exemption

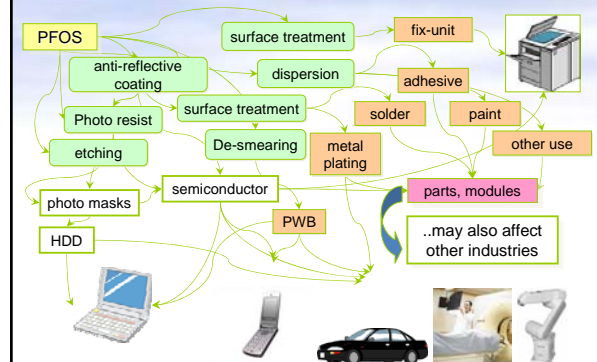
- Photo masks in the semiconductor and LCD industries
- Hard metal plating
- Decorative metal plating
- Electric and electronic parts for some color printers and color copy machines
- Insecticides for control of red imported fire ants and termites
- Chemically driven oil production
- Carpets
- Leather and apparel
- Textiles and upholstery
- Paper and packaging
- Coatings and coating additives
- Rubber and plastics



Challenge: PFOS is used in numerous processes and parts



Long supply-chain, involve many producers/users



Key recommendations of POPRC on risk reduction for PFOS

- Continue research and development on safe alternatives
- Raise awareness about environmental and human health effects of using PFOS
- Train professionals for handling and disposal of PFOS
- Limit industrial applications to closed-loops systems
- Implement strategies to destroy stocks containing PFOS
- Avoid landfilling of wastes containing PFOS
- Apply BAT/BEP for industrial uses of PFOS and destruction of industrial wastes
- Investigate environmental contamination from landfills and in industrial use areas
- Identify sites contaminated with PFOS and implement remediation measures

Work Programme on BDEs & PFOS adopted at COP5 by decision 5/5

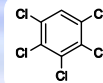
- encourages Parties and stakeholders to implement recommendations of POPRC, taking into account national circumstances
- encourages Parties to ensure that waste materials containing BDEs listed in Annex A are not exported to developing countries and countries with economies in transition
- requests Secretariat to compile information from Parties, for submission to COP6
- requests POPRC to develop terms of reference for a technical paper on the identification and assessment of alternatives to the use of perfluorooctane sulfonic acid in open applications
- requests Secretariat to commission the technical paper for consideration by POPRC
- requests POPRC to develop recommendations based on the paper for consideration at COP6

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POPS FROM UNINTENTIONAL PRODUCTION

Pentachlorobenzene

- Proposal: 2006, European Community
- Risk profile: UNEP/POPS/POPRC.3/20/Add.7
- Risk management evaluation: UNEP/POPS/POPRC.4/15/Add.1



Past use: Component of PCB products, fungicide, flame retardant.

Currently: Possible continuous use as intermediate for production of quintozone (pentachloronitrobenzene: fungicide).
Unintentional production during combustion, thermal and industrial processes
Impurities in chlorinated products e.g. solvents, pesticides.

Alternatives: Available

- Listed in: **Annex A (Elimination)**
- Production: Total ban - **No exemption**
- Use: Total ban - **No exemption**
- Listed in: **Annex C (Unintentional production)**



Challenge for PeCB: eliminating releases from unintentional production (Article 5)

- Release inventory:

Point sources:

Combustion and thermal process (e.g. municipal and hazardous waste incineration) and industrial process (e.g. metal ore production)

Diffuse sources:

Impurities in products such as solvents, pesticides, wood preservatives, barrel burning of wastes, open fire place, accidental fire, forest burning

- Apply measure for release reduction or source elimination:

Point sources:

-Apply BAT/BEP (correlation with PCDD/F formation by combustion; therefore same BAT/BEP can be applied for reduction of PeCB)

-Emissions factor for PeCB under development

Diffuse sources:

Prevent through awareness raising and legislation

The newest POP: endosulfan

- Proposal: 2007, European Community
- Risk profile: UNEP/POPS/POPRC.5/10/Add.2
- Risk management evaluation: UNEP/POPS/POPRC.6/13/Add.1

Past use: insecticide, wood preservative, veterinary insecticide.

Currently: Broad range insecticide in agriculture.

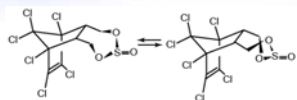
Alternatives: Available in many geographical situations; continued use required during phase-in of alternatives in some countries; may be difficult to replace endosulfan for specific crop-pest complexes.

Listing of endosulfan

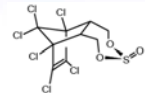
- Decision adopted at COP5 in April 2011
- Entry into force: 27 October 2012
- NIPs to be updated 2 years after entry into force

Technical endosulfan (CAS No: 115-29-7)

alpha-endosulfan
(CAS No: 959-98-8)



beta-endosulfan
(CAS No: 33213-65-9)



- Listed in: **Annex A (Elimination)**
- Production: **Exemptions for Parties listed in Register of specific exemptions**
- Use: **Exemptions for crop-pest complexes (example: wheat/aphids) as listed in accordance with the provisions of part VI of Annex A**

Trade of new POPs between Parties

Trade of the new POPs with specific exemptions and/or acceptable purposes in Annex A or B is allowed between Parties for:

- lindane (specific exemption for health purposes)
- endosulfan (specific exemptions for pest/crop complexes)
- PFOS, its salts, PFOSF and PFOS related chemicals (specific exemptions and acceptable purposes)
- commercial pentaBDE and octaBDE (specific exemption)
- provided the exporting Party has notified a specific exemption and the importing Party has notified the same specific exemption
- provided the exporting Party has notified an acceptable purpose and the importing Party has notified the same acceptable purpose

The relevant notifications by Parties to the Secretariat can be found on the website of the Stockholm Convention www.pops.int

Development of new guidance for NIP updating

• **UNIDO with UNITAR and Stockholm Convention Secretariat:**
Development of guidance documents to assist countries to identify POPs in products/articles, establish inventories, undertake national surveillance of imported products or products in the market containing POPs, and to manage the production, use, recycling and waste disposal of industrial chemicals including BDEs and PFOS. Guidance is available.

• **UNEP and Stockholm Convention Secretariat:**
Global project to enhance capacity of laboratories to analyse the presence of newly listed POPs including BDEs and PFOS and to generate monitoring data for evaluating the effectiveness of implementation of the Stockholm Convention.

Guidance on the 10 new POPs & NIP updating



Summary

- 9 new POPs added to the Stockholm Convention in 2009
- 4 pesticides:
 - Main challenge is disposal of obsolete stockpiles
- 4 industrial chemicals:
 - Widespread distribution in products & articles in use
 - Contamination of recycling streams
 - Environmentally sound disposal of wastes
- 1 chemical from unintentional production (PeCB):
 - Reducing releases from point and diffuse sources
- 1 new pesticide POP: endosulfan listed at COP5 in April 2011
- Initial guidance available for NIP updating
- Further guidance being developed

<http://www.pops.int>



Thank you