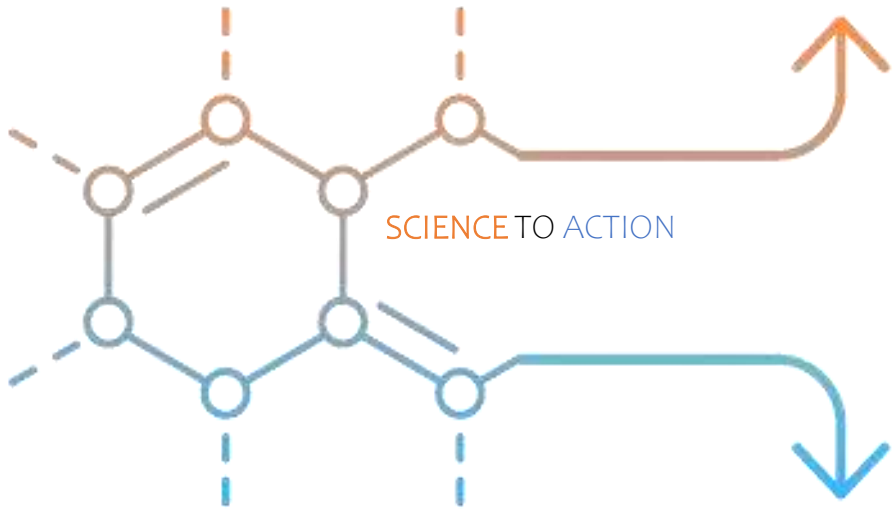
Workshop “From science to action, for the implementation of the BRS conventions and guidance on the environmentally sound management of industrial chemicals

Productos químicos listados en el Convenio de Estocolmo



12 April 2023

Agustín Harte
Secretariat of the Basel, Rotterdam and Stockholm Conventions

POPs listed under the Stockholm Convention

Anexo A – Eliminación

14 Pesticides:

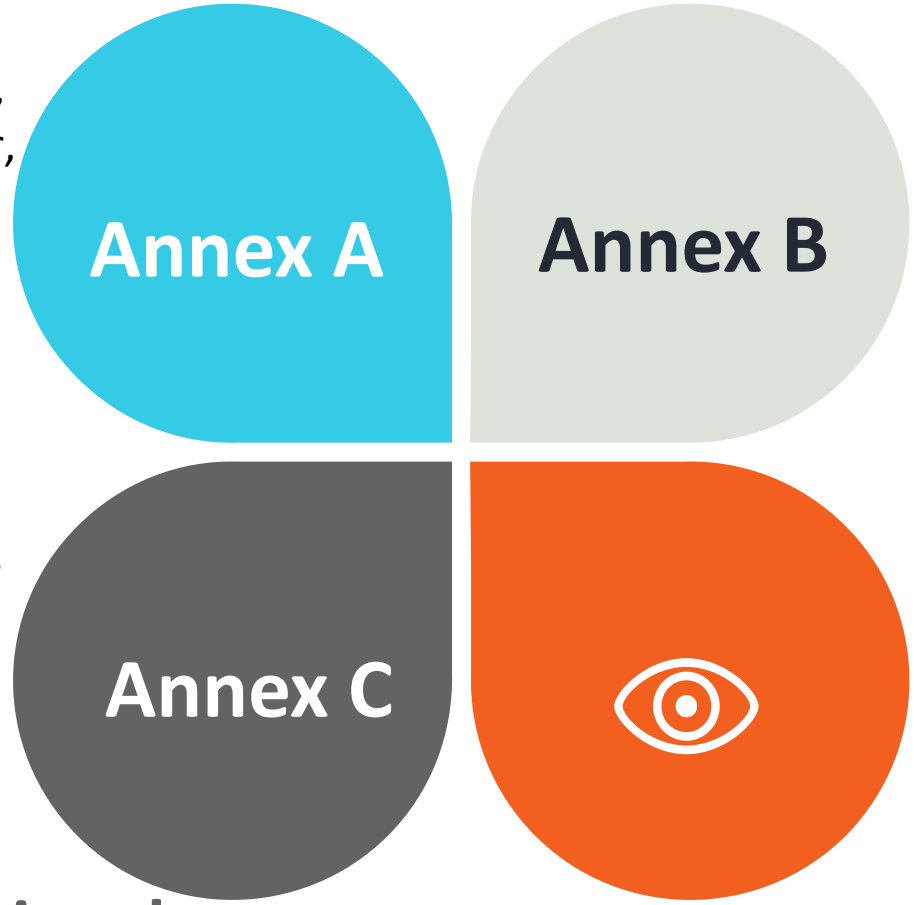
Aldrin, Chlordane, Chlordecone, Dicofol, Dieldrin, Endosulfan, Endrin, Heptachlor, Alpha/beta/gamma HCH, PCP, Toxaphene, Mirex*

**Also used as industrial chemicals*

13 Industrial POPs:

C-DecaBDE, C-OctaBDE, C-PentaBDE, HBB, HBCDD, HCBD, PCB, PCN, PFOA, its salts and PFOA-related compounds, PFHxS, its salts an PFHxS-related compounds, SCCPs, PeCB*, HCB*

**Also used as pesticides*



Anexo C – COPs no intencionales

7 U-POPs:

HCB, HCBD, PeCB, PCB, PCDD/PCDF, PCN

Anexo B - Restriction

1 Pesticide: DDT

1 Industrial POP: PFOS, its salts and PFOSF

**Annex B chemicals have "Acceptable purposes" for which Parties can continue production/use if registered.*

Under review

Article 8, Annex D, E, F,
POPs Review Committee (POPRC)

Year 1: Proposal / Annex D screening

↓

Year 2: Annex E risk profile

↓

Year 3: Annex F risk management evaluation / recommendation

↓

Year 4: COP decision

COP 6 - 2013

hexabromocyclododecane (HBCD)
Is a white solid substance. Its structural formula is a cyclic ring structure with Br-atoms attached**.**

Use and production

HBCD is used a **flame retardant additive**, providing fire protection during the service life of **vehicles, buildings or articles**, as well as protection while stored. The main uses of HBCD globally are in **expanded and extruded polystyrene foam insulation** while the use in **textile applications and electric and electronic appliances** is smaller.

POPs characteristics of HBCD

HBCD has a strong potential to bioaccumulate and biomagnify . It is persistent in the environment and has a potential for long-range environmental transport. It is very toxic to aquatic organisms. Though information on the human toxicity of HBCD is to a great extent lacking, vulnerable groups could be at risk, particularly to the observed neuroendocrine and developmental toxicity of HBCD.

Replacement of HBCD

The **production of HBCD has decreased** in the last few years and there are already available on the market chemical alternatives to replace HBCD in high-impact polystyrene (HIPS) and textile back-coating.

COP 6 - 2013

hexabromocyclododecane (HBCD)

Specific Exemptions

Production

As allowed for the Parties listed in the Register in accordance with the provisions of Part VII of this Annex

Use

Expanded polystyrene and extruded polystyrene in buildings in accordance with the provisions of Part VII of this Annex

SC-10/5: Exemptions

Notes, pursuant to paragraph 9 of Article 4 of the Stockholm Convention on Persistent Organic Pollutants, that, as there are no longer any Parties registered for specific exemptions for the production and use of hexabromocyclododecane, pentachlorophenol and technical endosulfan and its related isomers, no new registrations may be made with respect thereto;

COP 7 - 2015

Hexachlorobutadiene (HCBD)

Use

Most commonly used as a **solvent** for other chlorine-containing compounds.

Production

Hexachlorobutadiene occurs as a by-product during the chlorinolysis of butane derivatives in the **production of both carbon tetrachloride and tetrachloroethene**. These two commodities are manufactured on such a large scale, that enough HCBD can generally be obtained to meet the industrial demand.

Toxicity

Systemic toxicity following exposure via oral, inhalation, and dermal routes. Effects may include fatty liver degeneration, epithelial necrotizing nephritis, central nervous system depression and cyanosis. The USEPA has classified hexachlorobutadiene as a group C Possible Human Carcinogen.

Alternatives

It seems that HCBD is no longer intentionally produced and used in the UNECE region including in the US and Canada; specific information on current intentional production and use and for the past 30 years is lacking. This indicates that substitution has taken place and alternatives are available.

2017 COP8 - Annex C

COP 7 - 2015

Pentachlorophenol and its salts and esters

Use

PCP has been used as herbicide, insecticide, fungicide, algaecide, disinfectant and as an ingredient in antifouling paint. Some applications were in agricultural seeds, leather, wood preservation, cooling tower water, rope and paper mill system. Its use has been significantly declined due to the high toxicity of PCP and its slow biodegradation.

Production

First produced in the 1930s, it is marketed under many trade names. The main contaminants include other polychlorinated phenols, polychlorinated dibenzo-p-dioxins, and polychlorinated dibenzo furans.

Toxicity

People may be exposed to PCP in occupational settings through the inhalation of contaminated workplace air and dermal contact or with wood products treated with PCP. Short-term exposure to large amounts of PCP can cause harmful effects on the liver, kidneys, blood, lungs, nervous system, immune system, and gastrointestinal tract. Elevated temperature, profuse sweating, uncoordinated movement, muscle twitching, and coma are additional side effects. Contact with PCP can irritate the skin, eyes, and mouth. Long-term exposure to low levels such as those that occur in the workplace can cause damage to the liver, kidneys, blood, and nervous system. Finally exposure to PCP is also associated with carcinogenic, renal, and neurological effects.

Alternatives

Both chemical and non-chemical alternatives exist for PCP within applications for utility poles and cross arms.

COP 7 - 2015

Pentachlorophenol and its salts and esters

Production

As allowed for the Parties listed in the Register in accordance with the provisions of Part VIII of this Annex

Use

Pentachlorophenol for utility poles and cross-arms in accordance with the provisions of Part VIII of this Annex

Activity	Specific exemption	Party	Expiry date	Estimated quantity of production / use	Purpose(s) of production / use
Production	As allowed for the parties listed in the Register in accordance with the provisions of part VIII of Annex A	Mexico	Expired on 15/12/2021	6800 metric tons per year	Production of pentachlorophenol, 99.98% for shipment to the United States of America and 0.02% for sale in the national territory; the specific uses are those expressed in the Conference of the Parties, i.e. for treatment of utility poles and cross-arms.

SC-10/5: Exemptions

Notes, pursuant to paragraph 9 of Article 4 of the Stockholm Convention on Persistent Organic Pollutants, that, as there are no longer any Parties registered for specific exemptions for the production and use of hexabromocyclododecane, pentachlorophenol and technical endosulfan and its related isomers, no new registrations may be made with respect thereto;

COP 7 - 2015

polychlorinated naphthalenes

Use

PCNs make effective **insulating coatings for electrical wires**. Others have been used as **wood preservatives**, as **rubber and plastic additives**, for **capacitor dielectrics and in lubricants**.

Production

Made by chemically reacting chlorine with naphthalene, a soft, pungent solid made from coal or petroleum and often used for mothproofing. PCNs started to be produced for high-volume uses around 1910 in both Europe and the United States. To date, intentional production of PCN is assumed to have ended. PCN are unintentionally generated during high-temperature industrial processes in the presence of chlorine.

Toxicity

After about twenty years of commercial production, health hazards began to be reported in workers exposed to PCNs: severe skin rashes and liver disease that led to deaths of workers. While some PCNs can be broken down by sunlight and, at slow rates, by certain microorganisms, many PCNs persist in the environment. Acute exposure causes chloracne. Chronic exposure increases risk of liver disease. Increased cancer risks have been suspected but so far not shown. Current concerns about PCNs include their release as byproducts of waste incineration.

COP 7 - 2015

polychlorinated naphthalenes

Production

Intermediates in production of polyfluorinated naphthalenes, including octafluoronaphthalene

Use

Production of polyfluorinated naphthalenes, including octafluoronaphthalene

Activity	Specific exemption	Party	Expiry date	Estimated quantity of production / use	Purpose(s) of production / use
Production	Intermediates in production of polyfluorinated naphthalenes, including octafluoronaphthalene	Russian Federation	5 years with possible extension	500 metric tons per year	Intermediates in production of polyfluorinated naphthalenes, including octafluoronaphthalene.
Use	Production of polyfluorinated naphthalenes, including octafluoronaphthalene	Russian Federation	5 years with possible extension	500 metric tons per year	Production of polyfluorinated naphthalenes, including octafluoronaphthalene.

COP 8 - 2017

decabromodiphenyl ether (commercial mixture, c-decaBDE)

The commercial mixture consists primarily of the fully brominated decaBDE congener in a concentration range of 77.4-98 %, and smaller amounts of the congeners of nonaBDE (0.3-21.8 %) and octaBDE (0-0.04 %)

Use and Production

DecaBDE is used as an additive flame retardant and has a variety of applications including in **plastics/polymers/composites, textiles, adhesives, sealants, coatings and inks**. DecaBDE containing plastics are used in **housings of computers and TVs, wires and cables, pipes and carpets**. Commercially available decaBDE consumption peaked in the early 2000's, but c-decaBDE is still extensively used worldwide.

POPs characteristics of c-decaBDE

The decaBDE is highly persistent, has a high potential for bioaccumulation and food-web biomagnification, as well as for long-range transport. Adverse effects are reported for soil organisms, birds, fish, frog, rat, mice and humans.

Replacement of deca-BDE

A number of non-POP chemical alternatives are already on the market for the substitution of c-decaBDE in plastics and textiles. Furthermore, non-chemical alternatives and technical solutions such as non-flammable materials and physical barriers, respectively, are also available.

COP 8 - 2017

decabromodiphenyl ether (commercial mixture, c-decaBDE)

Production

As allowed for the Parties listed in the Register

Use

In accordance with Part IX of this Annex:

- Parts for use in vehicles specified in paragraph 2 of Part IX of this Annex
- Aircraft for which type approval has been applied for before December 2018 and has been received before December 2022 and spare parts for those aircraft
- Textile products that require anti-flammable characteristics, excluding clothing and toys
- Additives in plastic housings and parts used for heating home appliances, irons, fans, immersion heaters that contain or are in direct contact with electrical parts or are required to comply with fire retardancy standards, at concentrations lower than 10 per cent by weight of the part
- Polyurethane foam for building insulation

Brazil, EU, Republic of Korea, Switzerland, UK(both); Brazil, Iran, New Zealand, Norway, Vietnam (use)

COP 8 - 2017

short-chain chlorinated paraffins

Use and Production

SCCPs can be used as a plasticizer in rubber, paints, adhesives, flame retardants for plastics as well as an extreme pressure lubricant in metal working fluids. Chlorinated paraffins are produced by chlorination of straight-chained paraffin fractions. The carbon chain length of commercial chlorinated paraffins is usually between 10 and 30 carbon atoms. Short-chained chlorinated paraffins is between C10 and C13

POPs characteristics

SCCPs are sufficiently persistent in air for long range transport to occur and appear to be hydrolytically stable. Many SCCPs can accumulate in biota. It is concluded that SCCPs are likely, as a result of their long range environmental transport, to lead to significant adverse environmental and human health effects.

COP 8 - 2017

short-chain chlorinated paraffins

Production

As allowed for the Parties listed in the Register

Use

- Additives in the production of transmission belts in the natural and synthetic rubber industry
- Spare parts of rubber conveyor belts in the mining and forestry industries
- Leather industry, in particular fatliquoring in leather
- Lubricant additives, in particular for engines of automobiles, electric generators and wind power facilities, and for drilling in oil and gas exploration, petroleum refinery to produce diesel oil
- Tubes for outdoor decoration bulbs
- Waterproofing and fire-retardant paints
- Adhesives
- Metal processing
- Secondary plasticizers in flexible polyvinyl chloride, except in toys and children's products

Vietnam

UNEP/POPS/COP.11/4

COP 8 - 2019

dicofol

Use

Dicofol is an organochlorine miticidal pesticide that has been used in agriculture to control mites on a variety of field crops, fruits, vegetables, ornamentals, cotton, tea. It was also used an acaricide for cotton, citrus and apple crops.

POPs characteristics of dicofol

Monitoring data have shown that dicofol is sufficiently persistent to be transported via riverine input to the open sea and to be detected in deep sediment layers dated back several decades. Dicofol has a high bioconcentration potential as demonstrated by experimental derived bioconcentration factor values in fish. Model results showed that dicofol and its metabolites can be transported to remote regions. Limited monitoring evidence of dicofol in environmental media from remote sources is available. Similar to DDT, dicofol is a toxic concentrated formulation found in the environment and humans with a long persistent and bioaccumulatative property. Prolonged or repeated exposure to dicofol can cause skin irritation, hyperstimulation of nerve transmissions along nerve axons. Dicofol is highly toxic in fish, aquatic invertebrates, algae and in birds is tied to eggshell thinning and reduced fertility.

KEY FACTS

Per- and polyfluoroalkyl substances (PFASs) are chemicals that have partially or completely fluorinated carbon chains of varied lengths. These substances are used in almost all industry branches and many consumer products (Glüge et al. 2020) such as:

Chemical industry including PTFE production

Metal plating industry

Photo imaging industry

Semi-conductor industry

Many are excellent water-, oil- and dirt-proof surface protectors, or stable surfactants stable surfactants.

Non-stick cook and bake-ware

Fire-fighting foams

Water- and oil-proof apparel

Stain resistant upholstery, carpet, etc.

Biocides, household agents such as cleaning agents and impregnation sprays

Food packaging

COP 4 - 2011

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

Use and production

PFOS is both intentionally produced and an unintended degradation product of related anthropogenic chemicals. The current intentional use of PFOS is widespread and includes: electric and electronic parts, fire fighting foam, photo imaging, hydraulic fluids and textiles. PFOS is still produced in several countries.

POPs characteristics of PFOS

PFOS is extremely persistent and has substantial bioaccumulating and biomagnifying properties, although it does not follow the classic pattern of other POPs by partitioning into fatty tissues but instead binds to proteins in the blood and the liver. It has a capacity to undergo long-range transport and also fulfills the toxicity criteria of the Stockholm Convention.

Replacement of PFOS

While alternatives to PFOS are available for some applications, this is not always the case in developing countries where existing alternatives may need to be phased in

Evaluation of the continued need for PFOS

Every 4 years (2015, 2019, 2023…)

- **Hard metal plating** in closed-loop systems
- **Fire-fighting foam** for liquid fuel vapour suppression and Class B fires in installed systems, including both mobile and fixed systems

2020–2025*
Specific exemptions
*for most Parties

2020–?
Acceptable purposes

- Insect baits with **sulfluramid** (CAS No. 4151-50-2) as an active ingredient for control of leaf-cutting ants from *Atta spp.* and *Acromyrmex spp.* for agricultural use only

- Photo masks in semiconductor/LCD
- Decorative metal plating
- Parts for color printers/color copy machines
- Insecticides for red imported fire ants/termites
- Chemically driven oil production
- Carpets; Leather/apparel; Textile/upholstery; Paper/packaging; Coatings/coating addtives; Rubber/plastics

2009–2019
Removed specific exemptions

2009–2019
Removed acceptable purposes

- Photo-imaging
- Photo-resist/anti-refletive coatings for semiconductors
- Etching agent for compound semiconductors and ceramic filters
- Hard metal plating in closed-loop
- Aviation hydraulic fluids
- Certain medical devices
- Fire-fighting foam

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

List of acceptable purposes and specific exemptions for production and use of PFOS, its salts and PFOS-F decision SC-9/4

Acceptable purposes:
Insect baits with sulfluramid (CAS No. 4151-50-2) as an active ingredient for control of leaf-cutting ants from *Atta* spp. and *Acromyrmex* spp. for agricultural use only.

Argentina

Fire-fighting foam for liquid fuel vapour suppression and liquid fuel fires (Class B fires) in installed systems, including both mobile and fixed systems, in accordance with paragraph 10 of part III of this Annex

Specific exemptions:
Metal plating (hard-metal plating) only in closed-loop systems; fire-fighting foam for liquid fuel vapour suppression and liquid fuel fires (Class B fires) in installed systems, including both mobile and fixed systems.

Norway, Switzerland

COP 9 - 2019

perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds

Use and production

PFOA, its salts and PFOA-related compounds are used widely in the production of fluoroelastomers and fluoropolymers, for the production of non–stick kitchen ware, food processing equipment. PFOA-related compounds, including side-chain fluorinated polymers, are used as surfactants and surface treatment agents in textiles, paper and paints, firefighting foams. PFOA has been detected in industrial waste, stain resistant carpets, carpet cleaning liquids, house dust, microwave popcorn bags, water, food, and Teflon. Unintentional formation of PFOA is created from inadequate incineration of fluoropolymers from municipal solid waste incineration with inappropriate incineration or open burning facilities at moderate temperatures.

Replacement of PFOA

Alternatives to all uses of PFOA in fire-fighting foams exist and include fluorine-free solutions as well as fluorosurfactants with C6-fluorotelomers. Fluorine-free foams are comparable to fluorine-based AFFFs and fire-fighting foams with PFOA in their performance and in meeting relevant certifications for almost all uses.

perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds

Production

• Fire-fighting foam: None

• For other production, as allowed for the Parties listed in the Register in accordance with the provisions of part X of this Annex

Use

In accordance with the provisions of part X of this Annex:

• Photolithography or etch processes in semiconductor manufacturing

• Photographic coatings applied to films

• Textiles for oil and water repellency for the protection of workers from dangerous liquids that comprise risks to their health and safety

• Invasive and implantable medical devices

• Fire-fighting foam for liquid fuel vapour suppression and liquid fuel fires (Class B fires) in installed systems, including both mobile and fixed systems, in accordance with paragraph 2 of part X of this Annex

• Use of perfluorooctyl iodide for the production of perfluorooctyl bromide for the purpose of producing pharmaceutical products, in accordance with the provisions of paragraph 3 of part X of this Annex

• Manufacture of polytetrafluoroethylene (PTFE) and polyvinylidene fluoride (PVDF) for the production of:

▪ High-performance, corrosion- resistant gas filter membranes, water filter membranes and membranes for medical textiles

▪ Industrial waste heat exchanger equipment

▪ Industrial sealants capable of preventing leakage of volatile organic compounds and PM2.5 particulates

• Manufacture of polyfluoroethylene propylene (FEP) for the production of high-voltage electrical wire and cables for power transmission

• Manufacture of fluoroelastomers for the production of O-rings, v-belts and plastic accessories for car interiors

perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds

POPRC-17/9	Indicative list of substances covered by the listing of perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds

UNEP/POPS/POPRC.17/INF/14/Rev.1*

(a) Table 1: Indicative list of substances covered by the listing of PFOA, its salts and PFOA-related compounds;

(b) Table 2: Indicative list of substances not covered by the listing of PFOA, its salts and PFOA-related compounds;

(c) Table 3: 2D structural formulas for some selected substances added by Switzerland to the indicative list of substances covered by the listing of PFOA, its salts and PFOA-related compounds.

COP 10 - 2019

perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds

Use and production

PFHxS, its salts and PFHxS related compounds have been intentionally used at least in the following applications: (1) Aqueous Film-Forming Foams (AFFFs) for fire-fighting; (2) metal plating; (3) textiles, leather and upholstery; (4) polishing agents and cleaning/washing agents; (5) coatings, impregnation/proofing (for protection from damp, fungus etc.); and (6) within the manufacturing of electronics and semiconductors. In addition, other potential use categories may include pesticides, flame retardants, paper and packaging, in the oil industry, and hydraulic fluids. PFHxS, its salts and PFHxS related compounds have been used in certain per- and polyfluoroalkyl substances (PFASs) based consumer products.

PFHxS is and has been unintentionally produced during the electrochemical fluorination (ECF) processes of some other PFSAs. In many applications, PFHxS has been used as a replacement for perfluorooctane sulfonic acid (PFOS).

No exemptions!

COP 10 - 2019

perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds

Use and production

PFHxS, its salts and PFHxS related compounds have been intentionally used at least in the following applications: (1) Aqueous Film-Forming Foams (AFFFs) for fire-fighting; (2) metal plating; (3) textiles, leather and upholstery; (4) polishing agents and cleaning/washing agents; (5) coatings, impregnation/proofing (for protection from damp, fungus etc.); and (6) within the manufacturing of electronics and semiconductors. In addition, other potential use categories may include pesticides, flame retardants, paper and packaging, in the oil industry, and hydraulic fluids. PFHxS, its salts and PFHxS related compounds have been used in certain per- and polyfluoroalkyl substances (PFASs) based consumer products.

PFHxS is and has been unintentionally produced during the electrochemical fluorination (ECF) processes of some other PFSAs. In many applications, PFHxS has been used as a replacement for perfluorooctane sulfonic acid (PFOS).

No exemptions!

An old “friend”

Polychlorinated biphenyls (PCB)

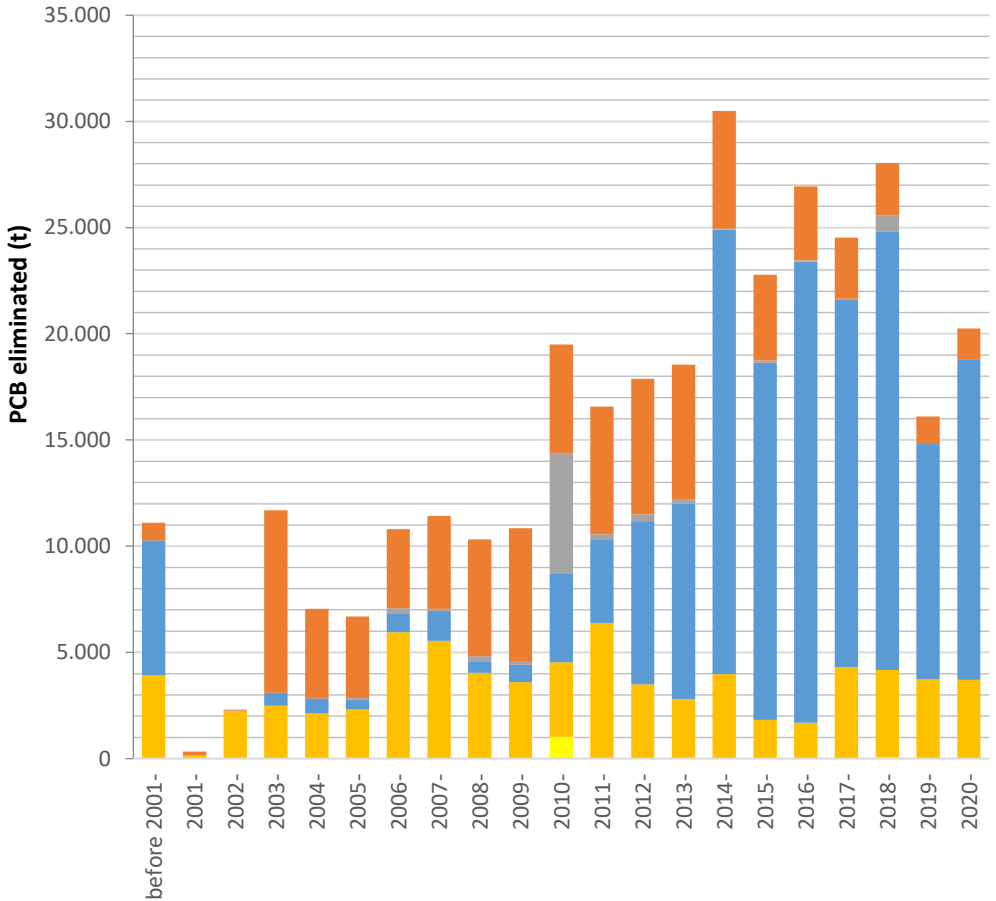
(a) With regard to the elimination of the use of polychlorinated biphenyls in equipment (e.g. transformers, capacitors or other receptacles containing liquid stocks) by 2025, subject to review by the Conference of the Parties,…

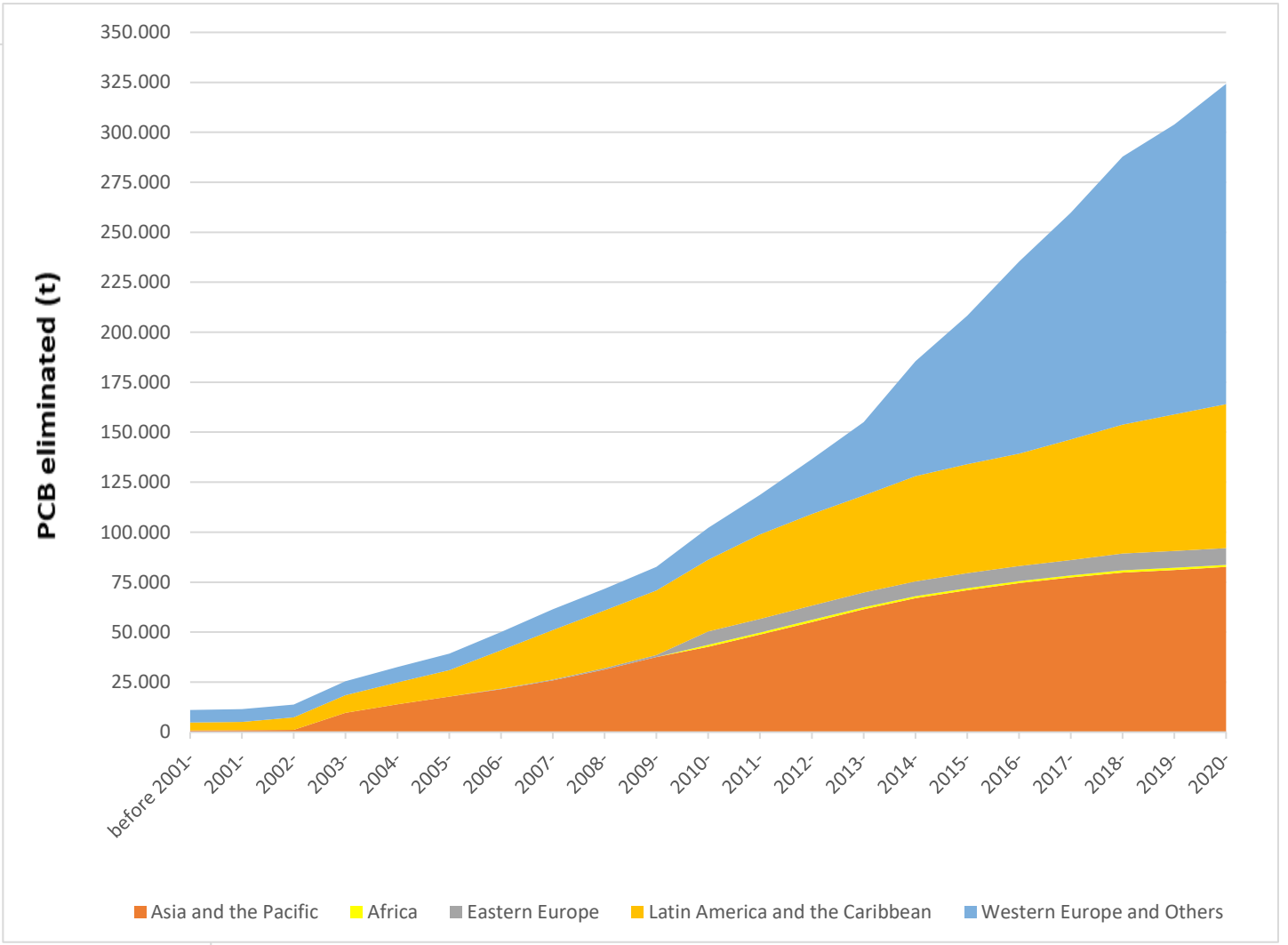
(e) Make determined efforts designed to lead to environmentally sound waste management of liquids containing polychlorinated biphenyls and equipment contaminated with polychlorinated biphenyls having a polychlorinated biphenyls content above 0.005 per cent, in accordance with paragraph 1 of Article 6, as soon as possible but no later than 2028, subject to review by the Conference of the Parties;

(f) In lieu of note (ii) in Part I of this Annex, endeavour to identify other articles containing more than 0.005 per cent polychlorinated biphenyls (e.g. cable-sheaths, cured caulk and painted objects) and manage them in accordance with paragraph 1 of Article 6;

Old friends

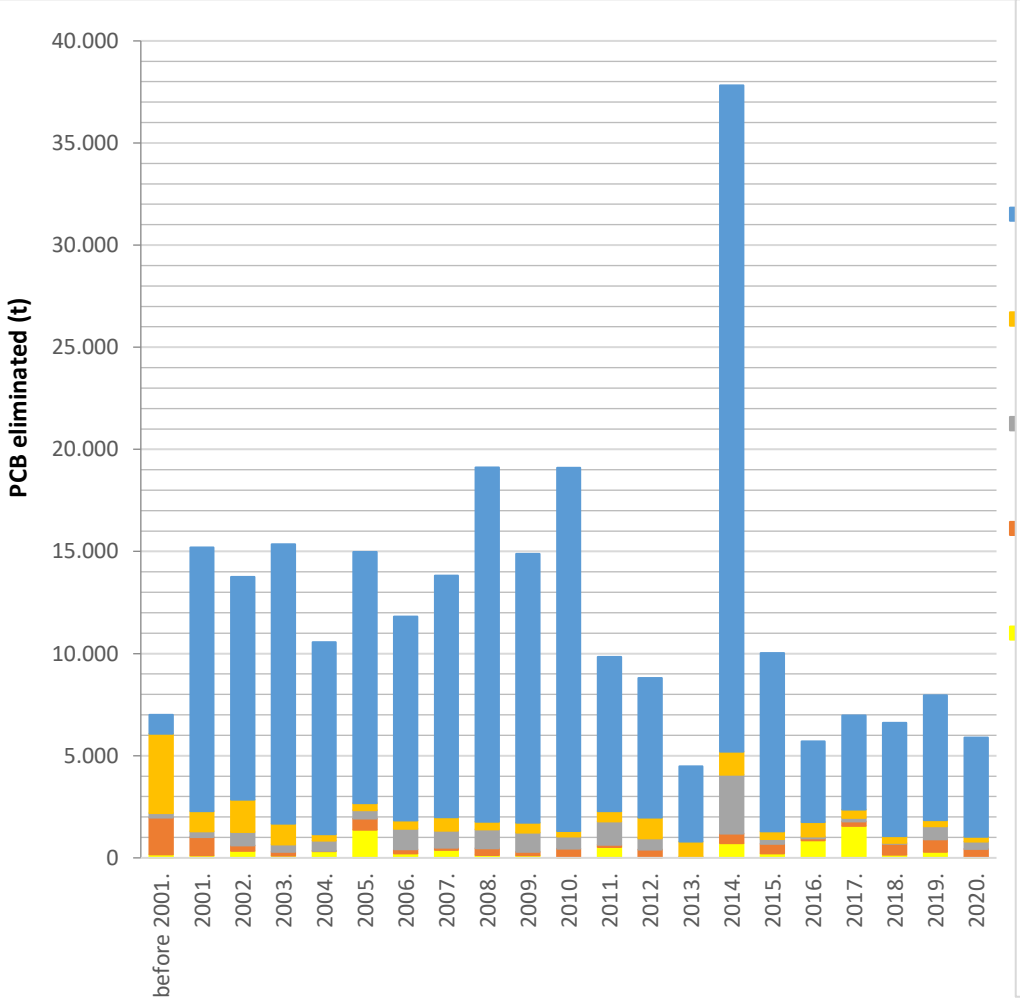
Polychlorinated biphenyls (PCB)

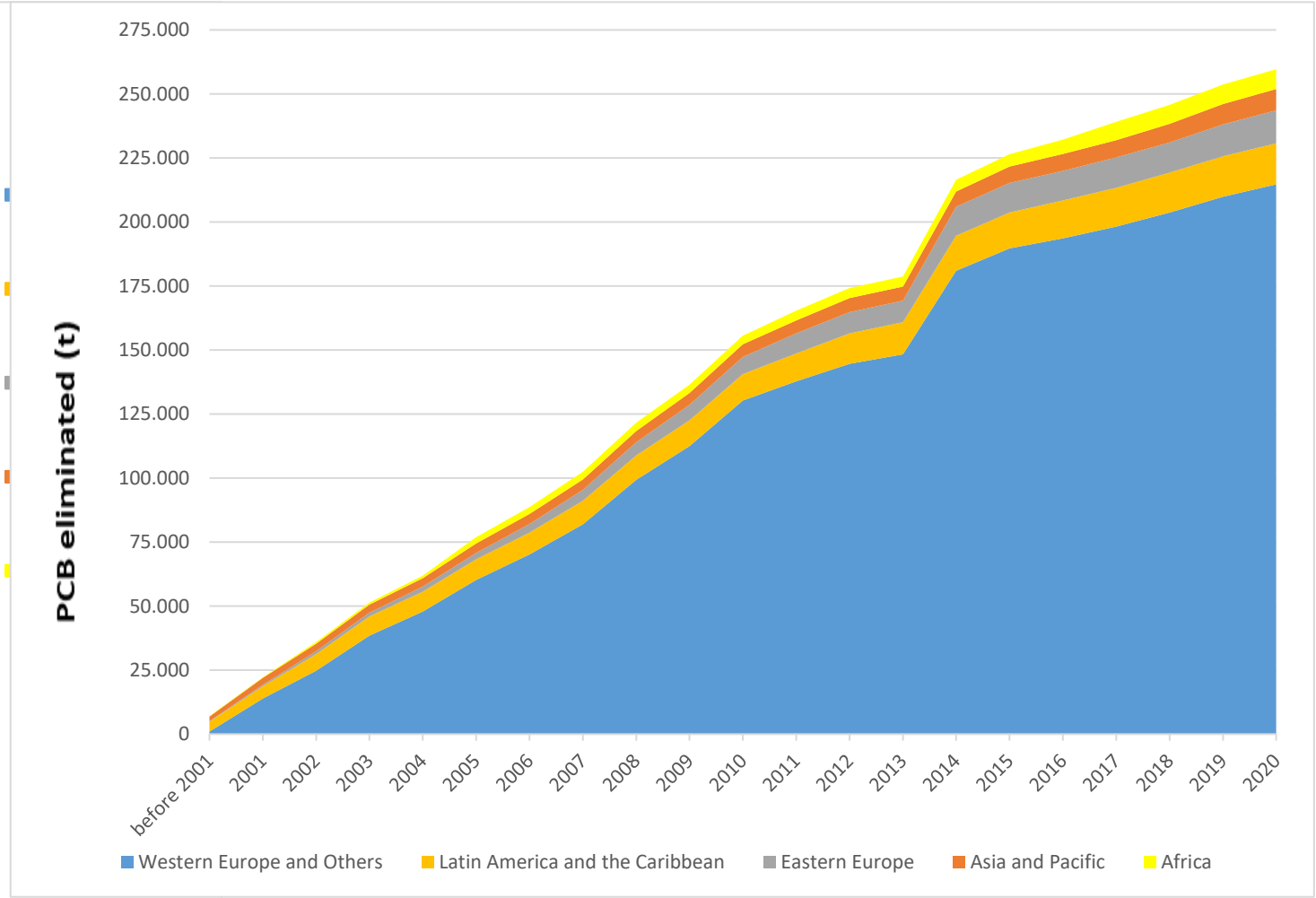




Old friends

Polychlorinated biphenyls (PCB)





Workshop “From science to action, for the implementation of the BRS conventions and guidance on the environmentally sound management of industrial chemicals

Thank you

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