

# Candidate POPs Criteria, Processes and Existing Status



Toxics Link  
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## Candidate POPs: A Background

Candidate POPs are those compounds, which are being considered by POP Review Committee (POPRC) to include in the existing list of 12 POPs.

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a living convention and does more than address the original 'dirty dozen' POPs chemicals. It recognizes the need to take global action on all chemicals with POP-like characteristics. These include:

- Persistent in the environment
- Travel long distances via air and water
- Toxic
- Bioaccumulate in living things

Substances with these characteristics pose an unacceptable threat to human health and the environment.

The Stockholm Convention established a 'science based' process for evaluating candidate POPs as outlined in Article 8 and Annexes D, E, and F of the convention. The process applies the precaution-

ary principle by recognising that lack of full scientific certainty should not prevent a candidate substance from proceeding through the process.

## Candidate POPs: Criteria and Process

The Stockholm Convention including Article 8 and Annexes D, E, F establishes the rules for identifying and listing additional POPs. Any country that has ratified the Convention can submit a proposal to the Secretariat for listing a chemical in Annexes A [for elimination], B [for restriction] and/or C [for unintentional production]. However, the proposal needs to contain the information specified in Annex D (Information Requirements and Screening Criteria).

This includes information on the:

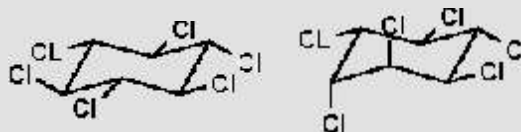
- **Chemical identity and structure**, including trade name/names, synonyms, Chemical Abstracts Service (CAS) Registry number and International Union of Pure and Applied Chemistry (IUPAC) name;

## AT A GLANCE



- ♦ **POPs are among the most dangerous of all pollutants released in the air by anthropogenic activities**
- ♦ **The Stockholm Convention, called for global action to be taken on POPs**
- ♦ **The Intergovernmental Forum on Chemical Safety (IFCS) and the International Programme for Chemical Safety (IPCS) prepared an assessment of the 12 worst offenders, known as the dirty dozen**
- ♦ **International POPs Elimination Network (IPEN) is a global network of public interest non-governmental organizations united in support of a common POPs Elimination Platform. The mission of IPEN is to work for the global elimination of persistent organic pollutants, on an expedited yet socially equitable basis. Toxics Link is also a part of this network**

## Persistent Organic Pollutants (POPs)



- ♦ Persistent in the environment
- ♦ Travel long distances via air and water
- ♦ Toxic
- ♦ Bioaccumulate in living things



## Stockholm Convention: An Introduction

The Stockholm Convention is an international legally binding agreement on persistent organic pollutants (POPs). In 1995, the Governing Council of the United Nations Environment Programme (UNEP) called for global action to be taken on POPs, which it defined as “chemical substances that persist in the environment, bio-accumulate through the food web, can travel long distances and pose a risk of causing adverse effects to human health and the environment”.

Following this, the Intergovernmental Forum on Chemical Safety (IFCS) and the International Programme for Chemical Safety (IPCS) prepared an assessment of the 12 worst offenders, known as the **dirty dozen**, this list includes eight organochlorine pesticides: **aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex and toxaphene**; two industrial chemicals: **hexachlorobenzene (HCB)** and the **polychlorinated biphenyl (PCB)** group; and two groups of industrial by-products or what are known as unintended by-products: **dioxins and furans**.

The negotiations for the Stockholm Convention on Persistent Organic Pollutants were completed on May 23rd 2001 in Stockholm, Sweden. The convention entered into force on May 17th, 2004 with ratification by 156 Parties and 152 signatories. Parties to the convention agreed to outlaw nine of the “dirty dozen” chemicals, limit the use of DDT to malaria control, and curtail inadvertent production of dioxins and furans. In the case of PCBs, although they are no longer produced, hundreds of thousands of tons are still in use in electrical transformers and other equipment. Governments have until 2025 to phase out these uses and have to arrange for PCB-free replacements. Parties to the convention have agreed to a process by which persistent toxic compounds can be reviewed and added to the convention, if they meet certain criteria for persistence, bioaccumulation, toxicity and long-range environmental transport.

The Stockholm Convention has come into force for India on January 13, 2006. India signed the Convention on 14th May 2002. As part of convention's commitments India has had to prepare a national implementation plan (NIP) by 18th April 2008. The NIP is still not in place.

- **Persistence** in the form of evidence of half-life in water greater than two months, or half-life in soil or sediment greater than six months, or other evidence that of persistence;
- **Bio-accumulation** in the form of evidence that the bio-concentration factor or bio-accumulation factor in aquatic species is greater than 5,000 or that the log Kow is greater than 5, or other evidence of high bio-accumulation in species, high toxicity or ecotoxicity, or monitoring data indicating bio-accumulation potential;
- **Potential for long-range environmental transport** in the form of measured levels of concern in locations distant from the source, or monitoring data showing long-range environmental transport, or environmental fate properties and/or model results that demonstrate the potential for long-range environmental transport through air (with a half-life in air should be greater than two days), water or migratory species; and
- **Evidence of adverse effects to human health or the environment** or toxicity or ecotoxicity data indicating potential to damage human health or the environment.

The nominating country also needs to state the reasons for concern and the need for global control. In preparing the nomination the country can use technical expertise from any source. The proposed new POPs and the supporting information are then reviewed by the Persistent Organic Pollutants Review Committee to see if the screening criteria have been fulfilled.

### POP Review Committee (POPRC): Composition and Functions

The members of the first Persistent Organic Pollutants Review Committee (POPRC) were appointed by the First Conference of the Parties (COP1) of the Stockholm Convention (May 2005, Uruguay) on the basis of “equitable geographical distribution, taking into account gender and the need for a balance between different types of expertise.”

The POPRC consist of 31 members:

- African States: 8
- Asian and Pacific States: 8
- Central and Eastern European States: 3
- Latin American and Caribbean States: 5
- Western European and other States: 7

Members of the POPRC are "government-designated experts in chemical assessment or management." To ensure effective rotation of the membership, one half of the members of each region were nominated for an initial term of two years, and the remaining members of each region were nominated for an initial term of four years. The list of members until 2010:

#### **Africa:**

Chad Mauritius, Ghana, Togo  
Burkina Faso, Morocco, Sierra Leone,  
South Africa

#### **Asia and the Pacific:**

India, Cambodia, Korea, Syrian Arab Republic  
China, Japan, Jordan, Thailand

#### **Central and Eastern Europe:**

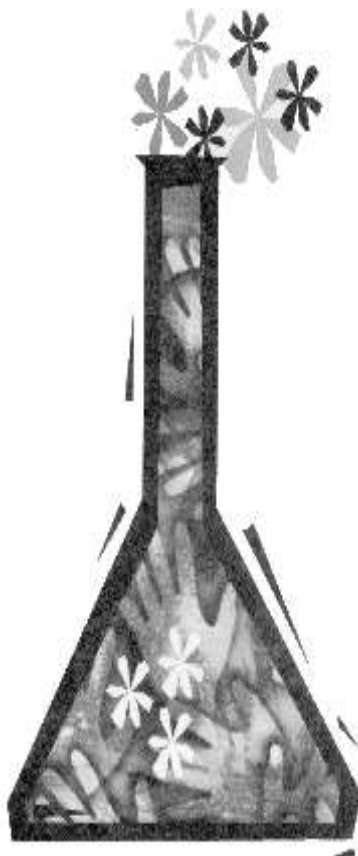
Armenia, Czech Republic, Bulgaria,

#### **Latin America and the Caribbean:**

Chile, Honduras  
Brazil, Ecuador, México

#### **Western Europe and others:**

France, Portugal, Switzerland,  
Australia, Canada, Germany, Sweden



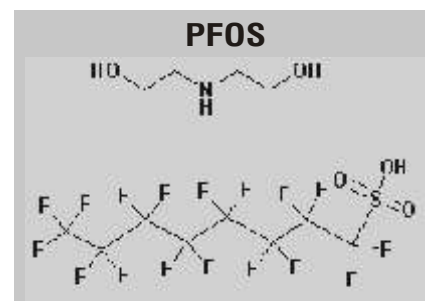
POPRC can also invite up to 30 experts (balancing developed and developing countries) to support its work. Countries can designate experts for inclusion in a roster of expert but if no expert on the roster has the specifically needed expertise on a certain issue, the POPRC can then invite other experts. The POPRC meetings are open to observers, while countries submitting a proposal are invited to attend the relevant POPRC meetings. The Persistent Organic Pollutants Review Committee (POPRC) reviews proposals for new POPs via three main stages.

1. If the proposal includes the required information, the POPRC consider whether the nominated chemical fulfills the criteria (POP-like characteristics) as outlined in Annex D.
2. If the POPRC find the chemicals fulfill the criteria, a risk profile based on the information in Annex E is then prepared.
3. If on the basis of the risk profile, the POPRC decides the chemical is likely as a result of its long range transport, to lead to significant adverse human health and/or environmental effects, such that global action is warranted then the POPRC will prepare a risk management evaluation based on information outlined in Annex F.

The POPRC may then recommend to the COP that the chemical be added to the Convention. The Conference of the Parties (all the countries that have ratified the Convention) makes the final decision on whether to list a chemical as a POP. If a proposal is rejected, it can be resubmitted and a Party can challenge the decision of the POPRC

#### **Nominated Chemicals under review**

The Stockholm Convention POPs Review Committee (POPRC) met for the fourth time from 12-17 October 2008 in Geneva, Switzerland to take final decisions on candidate chemicals for addition to the Convention. The POPRC IV decided to recommend nine chemicals (Nasty Nine), viz., Alpha HCH, Beta HCH, Chlordecone, HBB, OctaBDE, PeCB, Lindane, PentaBDE, PFOS for including them into the list of POPs about which COP4 is scheduled to take a final decision in May 2009. Table 1 shows the list of nominated chemicals under review by POPRC.



**Table 1: List of nominated chemicals under review by POPRC**

SI No.	Substance	Abbreviation	Proposing Party	Evaluation Stage
1	Alpha hexachlorocyclohexane	Alpha HCH	Mexico	Recommended for Annex A – No exemptions
2	Beta hexachlorocyclohexane	Beta HCH	Mexico	Recommended for Annex A – No exemptions
3	Chlordecone		European Union	Recommended for Annex A – No exemptions
4	Endosulfan		European Union	Annex E for preparing a Risk profile
5	Hexabromobiphenyl	HBB	European Union	Recommended for Annex A – No exemptions
6	Lindane		Mexico	Recommended for Annex A – Pharmaceutical exemption for lice and scabies
7	Octabromodiphenyl ether	OctaBDE	European Union	Recommended for Annex A – No exemptions
8	Pentabromodiphenyl ether	PentaBDE	Norway	Recommended for Annex A – No exemptions
9	Pentachlorobenzene	PeCB	European Union	Recommended for Annex A and Annex C; no exemptions
10	Perfluorooctane sulfonate	PFOS	Sweden	Recommended for Annex A or Annex B – Numerous Exemptions
11	<b>Short-chain chlorinated paraffins</b>	<b>SCCPs</b>	<b>European Union</b>	<b>Annex E – Action delayed for POPRC V</b>

Table 2 shows the "nasty nine" chemicals as decided by POPRC 4 for adding them into the list of POPs and important recommendations.

**Table 2: POPRC Candidates: Committee Conclusions**

Substance	Recommendations
Alpha HCH Beta HCH	Alpha HCH and Beta HCH were both recommended for listing in Annex A without any exemptions. The Committee noted that production of one of lindane produces up to eight tons of these toxic by products. The POPRC stated, "...the Conference of the Parties may wish to consider allowing a specific one time, transitional exemption for alpha- and beta-HCH concerning the production of lindane for control of head lice and scabies as a human health pharmaceutical only. The high ratio of alpha- and beta- HCH wastes to lindane product along with the availability of efficacious and cost effective lindane alternatives should be reflected in these considerations"
Chlordecone	Recommends listing chlordecone in Annex A with no specific exemptions. The Committee also recommends focusing efforts on identifying and managing obsolete stockpiles and wastes containing chlordecone.
HBB	Recommends listing HBB in Annex A with no specific exemptions.
Octa BDE	Recommends listing in Annex A without any exemptions
PeCB	Recommends listing in both Annex A and Annex C without any exemptions. PeCB is primarily produced unintentionally from the same sources as dioxins and furans. In the past it was used to make the pesticide quintozone as well as an additive in electrical equipment with PCBs.
Lindane	Recommends listing lindane in Annex A. The Committee also notes that the Parties may wish to consider allowing a specific exemption for human health pharmaceutical use with limited package size, appropriate labeling, second-line treatment only, protecting vulnerable groups especially infants, conducting outreach and awareness programs, and promoting alternatives products, methods, and strategies.
PentaBDE	Recommends listing the tetraBDE congener (BDE47) and the pentaBDE congener (BDE99) and other tetraBDE and pentaBDE congeners present in the commercial pentaBDE mixture in Annex A with no specific exemptions. The POPRC recommends using BDE47 and BDE99 as markers for enforcement purposes.
PFOS	Recommends listing PFOS, its salts, and PFOSF (a starting material for synthesis of PFOS-related substances) in Annex A or B. The Committee identified uses for possible exemptions including photoresists or anti reflective coatings for photolithography processes; photo mask rendering process; photo imaging; hydraulic fluids in aviation; and certain medical devices. In addition, the Committee identified some uses that have available alternatives that could be phased in for uses including ant baits for control of leaf-cutting ants; metal plating; fire fighting foam; and electric and electronic parts.



Table 3 gives trade names of these chemicals and their producers, while table 4 and 5 give their uses and health effects respectively

### IPEN's opinion on POPRC recommendations

International POPs Elimination Network (IPEN) is a global network of public interest non-governmental organizations united in support of a common POPs Elimination Platform. The mission of IPEN is to work for the global elimination of persistent organic pollutants, on an expedited yet socially equitable basis. Toxics Link is also a part of this network.

IPEN while welcoming the POPRC recommendations to include nine chemicals of concern in the list of POPs has following overview of the POPRC recommendations.

### Endosulfan

This currently used toxic pesticide caused uproar at POPRC 4. After a lot of debates and discussions, often acrimonious, the committee decided by voting to move endosulfan to the next stage of evaluation, Annex E for preparing a risk profile.

### SCCPs

The Committee evaluated SCCPs in the

Risk Profile Stage (Annex E) to decide whether to pass it to the Risk Management Evaluation (Annex F). The committee could not decide on passing it forward. Instead, the POPRC delayed consideration of SCCPs until POPRC 5 and decided to invite two outside experts on toxicology and two on ecotoxicology of SCCPs to help participate in the discussions.

It is unfortunate that SCCPs did not proceed to the Annex F evaluation at POPRC 4. We believe the SCCPs meet all Annex E criteria and strongly support efforts to finalize the Risk Profile and begin Annex F evaluation.

**Table 3. POPRC Candidates: Producers and trade names**

Substance	Past and Present Producers	Trade Names
Alpha HCH	Not intentionally produced; see Lindane	
Beta HCH	Not intentionally produced; see Lindane	
Chlordecone	Allied Chemical (USA); Life Sciences Products (USA); Hooker Chemical (USA); Nease Chemical (USA); De Laguarique (France); unnamed French and Brazilian companies	Kepone, GC-1189, Merex, ENT 16391, Curlone
Endosulfan	China; India (All India Medical Corp, Bharat Pulverizing Mills, Excel Industries, Krishi Rasayan, Mewar Oil and General Mills); Germany (Bayer CropScience, Hoechst); Israel (Makhteshim Chemical Works); Italy (Dupont); South Korea; Mexico (Production Quimicos de Chihuahua); Taiwan (Mictionion Industries); UK (FBC); USA (FMC, Drexel, SureCo)	Benzoepin, Beosit, Bio 5462, Chlorthiepin, Crisulfan, Cyclodan, Endocel, Endosol, EndossulfamE, Endossulfo, Endosulfan, Endosulfan 350EC, Endosulphan, ENT-23979, FMC 5462, Hildan, HOE 2671, Insectophene, Kop-Thiodan, Malix, NCI-C00566, NIA 5462, Niagara 5462, OMS 570, SD 4314, Thiofur, Thumul, Thiodan, Thionex, Farmoz, Nufarm, Tiovel
HBB	Michigan Chemical Corp (USA); White Chemical Corp (USA); Hexcel Corp (USA); Atochem (France); Berk Corp (UK); Chemische Fabrik Kalk (Germany)	Firemaster BP-6 Firemaster FF-1
Lindane	Companies in Albania, Argentina, Austria, Azerbaijan, Brazil, Bulgaria, China, Czech Republic, France, Germany (Bayer CropScience), Ghana, Hungary, India (KCIL, Kanoria, India Pesticides Ltd), Italy, Japan, Poland, Romania, Russia, Slovakia, Spain (Inquinosa), Turkey, United Kingdom, and USA (Crompton, Gustafson). It appears that only Romania and India are current producing countries.	Benhexachlor, BHC, Exagama, Forlin, Gallouama, Gamaphex, Gammex, Inexit, Isotox, Lindafor, Lindagam, Lindagrain, Lindagranox, Lindalo, Lindamul, Lindano, Lindapoudre, Lindaterra, Novigan, Silvanol
OctaBDE	Companies in France, Israel, Japan, Netherlands, UK, and USA.	
PentaBDE	Companies in China, EU, Israel (Dead Sea Bromine Group); Japan; and USA (Great Lakes Chemical now Chemtura)	
PeCB	PeCB was produced intentionally to make pentachloronitrobenzene (quintozene), a pesticide. Currently, it is believed to come primarily from unintentional production from sources that include: PCBs, chlorinated solvents, pesticides, chemical manufacturing, aluminum casting, waste combustion including barrel burning, ore treatment for metal production of magnesium, copper, niobium, tantalum, titanium dioxide production, wood treatment plants, and hazardous waste incineration.	
PFOS	Companies in Brazil (Milenia Agro Ciencias S.A.), China (Changjiang Chemical Plant), India (Indofine Chemical Co.), Italy (Miteni S.p.A., EniChem Synthesis S.p.A), Japan (Midori Kaguka Co., Tohkem Products Corp., Tokyo Kasei Kogyo Co.), Russia (Scientific Industrial Association P & M Ltd.) Switzerland (Fluka Chemical Co.), UK (BNFL Fluorochemicals Ltd., Fluorochem Ltd.), USA (3M)	
SCCPs	Companies in Brazil, Czech Republic, Germany (Clariant, Hoechst, Huels), Japan, Slovakia, USA (Dover Chemical Corp.)	Chlorowax 500C

**Table 4: POPRC Candidates: Uses**

Substance	Uses
Alpha HCH	None; waste product
Beta HCH	None; waste product
Chlordecone	Pesticide formerly used on banana root borer, fly larvicide, apple scab, powdery mildew, Colorado potato beetle, rust mite, wireworm, and household ant and roach traps.
Endosulfan	Insecticide for control of aphids, thrips, beetles, foliar feeding larvae, mites, borers, cutworms, bollworms, whiteflies, and leafhoppers. Used on cotton, tobacco, cantaloupe, tomatoes, squash, eggplant, sweet potato, broccoli, pears, pumpkins, corn, cereals, oilseeds, potatoes, tea, coffee, cacao, soybean, and other vegetables. Historically used to control termites and tsetse fly. Used in some countries in the past as a wood preservative.
HBB	Hexabromobiphenyl has been used as a fire retardant in acrylonitrile-butadiene-styrene (ABS) thermoplastics for constructing business, machine housings and in industrial and electrical products and in polyurethane foam for auto upholstery.
Lindane	Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ectoparasites in both veterinary and human applications including treatment of human lice and scabies.
OctaBDE	Flame retardant primarily for ABS plastics used in office equipment and business machines. Other uses include nylon, low density polyethylene, polycarbonate, phenol-formaldehyde resins, and unsaturated polyesters.
PentaBDE	PentaBDE been used almost exclusively in the manufacture of flexible polyurethane (PUR) foam for furniture and upholstery in homes and vehicles, packaging, and non-foamed PUR in casings and electronic equipment (EE). They are also used to some extent in specialized applications in textiles and in industry.
PeCB	No current intentional use believed though PeCB has been found in the following uses: PCBs, dyestuff carriers, flame retardant, and pesticides (quintozene, endosulfan, chlorpyrifos-methyl, atrazine, and clopyrilid). PeCB has been used to make paranitrochlorobenzene (quintozene).
PFOS	PFOS uses include: fire fighting foams, carpets, leather/apparel, textiles/upholstery, paper and packaging, coatings and coating additives, industrial and household cleaning products, pesticides and other insecticides, photographic industry, photolithography and semiconductor manufacturing, hydraulic fluids, and metal plating.
SCCPs	SCCPs are used primarily in metalworking applications. Other uses include uses as flame retardants or plasticizers in PVC, paints, adhesives, sealants in buildings, PCB substitutes in gaskets, leather fat liquors, and flame retardants in rubber, car carpets, textiles, and other polymers. SCCPs used as flame retardants are added to rubber in a proportion of 1-10%.

**Table 5: POPRC Candidates: Effects**

Substance	Effects
Alpha HCH	Alpha-HCH has been shown to be neurotoxic, hepatotoxic, and to cause immunosuppressive effects and cancer in laboratory animals. Several epidemiological studies indicate that alpha-HCH might play a role in human breast cancer as well as hormonal disorders leading to infertility and abortions.
Beta HCH	Toxicological studies with beta-HCH have demonstrated neurotoxicity and hepatotoxicity. Also reproductive and immunosuppressive effects and effects on fertility were seen in laboratory animals. Several epidemiological studies indicate that beta-HCH might play a role in human breast cancer. Beta HCH is acutely toxic to aquatic organisms and shows estrogenic effects in fish.
Chlordecone	The pesticide is both acutely and chronically toxic, producing neurotoxicity, immunotoxicity, reproductive, musculoskeletal and liver toxicity. Chlordecone is very toxic to aquatic organisms, with the most sensitive group being the invertebrates.
Endosulfan	Excessive and improper application and handling of endosulfan have been linked to congenital physical disorders, mental retardations and deaths in farm workers and villagers in developing countries in Africa, southern Asia and Latin America. Endosulfan was found among the most frequently reported intoxication incidents, adding unintentionally further evidence to its high toxicity for humans. In laboratory animals, endosulfan produces neurotoxicity effects, which are believed to result from over-stimulation of the central nervous system. It can also cause haematological effects and nephrotoxicity. Recent literature has indicated the potential for endosulfan to cause impaired development in amphibians, reduced cortisol secretion in fish, impaired development of the genital tract in birds and hormone levels, testicular atrophy and reduced sperm production in mammals.
HBB	Hepatotoxicity, effects on the thyroid, and endocrine disruption including effects on reproductive capacity in rats, mink and monkeys. There is epidemiological evidence of hypothyroidism in workers exposed to polybrominated biphenyls and of increased incidence of breast cancer in exposed women.
Lindane	Hepatotoxic, immunotoxic, reproductive and developmental effects have been reported for lindane in laboratory animals. The most commonly reported effects associated with oral exposure to gamma-HCH are neurological including seizures and convulsions in individuals who have accidentally or intentionally ingested lindane in insecticide pellets, liquid scabicide or contaminated food
OctaBDE	Unfortunately, the available information on the toxicity and ecotoxicity of hexa to nonaBDE [which make up commercial OctaBDE] is very limited. Effects on mammals and birds include slight fetotoxicity, increased liver weights, and delayed skeletal ossification. Other observed effects include immunotoxicity and neurotoxicity. There is increasing evidence suggesting similar toxicological profiles and therefore, equivalent hazards and concerns, between PBDEs and PCBs. Components of the octaBDE mixture may be released to the environment by debromination of commercial decaBDE.
PentaBDE	Toxicological studies have demonstrated reproductive toxicity, neurodevelopmental toxicity and effects on thyroid hormones in aquatic organisms and in mammals. Information is lacking on the effects in humans of short-term and long-term exposure, although it is to be expected that vulnerable groups can be pregnant women, embryos and infants.
PeCB	PeCB is moderately toxic to humans. Animal studies reveal effects including decreased thyroxin, abnormal sperm, and histopathological effects on the kidneys. Pentachlorobenzene is very toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.
PFOS	PFOS has demonstrated toxicity towards mammals in sub-chronic repeated dose studies at low concentrations, as well as rat reproductive toxicity with mortality of pups occurring shortly after birth. Environmental toxicity data for PFOS is predominantly found for aquatic organisms such as fish, invertebrates and algae, and for birds. PFOS is toxic to aquatic organisms with mysid shrimp and Chironomus tentans being the most sensitive organisms.
SCCPs	SCCPs can harm sensitive aquatic organisms at relatively low concentrations. SCCPs affect the liver, kidney and thyroid in rats including increased liver, weight, altered liver enzymes, and enlarged thyroid. Rodent studies showed dose related increases in adenomas and carcinomas in the liver, thyroid, and kidney. There continues to be contention over the mechanisms of these tumors and whether they are relevant for human health. SCCPs were classified as a group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC). There are no data on fertility or developmental effects for humans.

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