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**Stockholm Convention on Persistent Organic Pollutants**
**Persistent Organic Pollutants Review Committee**
**First meeting**
Geneva, 7–11 November 2005
Item 4 of the provisional agenda*

**Operational procedures**

# Verification process by the Secretariat**

## Note by the Secretariat

1. Pursuant to paragraph 1 of Article 8 of the Stockholm Convention on Persistent Organic Pollutants, a Party which submits a proposal to the Secretariat for listing a chemical in Annex A, B or C of the Convention must provide in the proposal the information specified in Annex D of the Convention (Information Requirements and Screening Criteria).

2. Paragraph 2 of the same Article reads as follows:

> "The Secretariat shall verify whether the proposal contains the information specified in Annex D. If the Secretariat is satisfied that the proposal contains the information so specified it shall forward the proposal to the Persistent Organic Pollutants Review Committee."

3. Pursuant to the above, the Secretariat has examined the five proposals which were submitted before 15 August 2005 using the verification process described below. It is important to keep in mind that the verification process is not an evaluation of the rigour or strength of the scientific information provided.

4. The verification process undertaken by the Secretariat involves an examination of the information which is provided in proposals:

(a) *Chemical identity*. Is there a clear identification of the chemical(s) proposed, as described in Annex D, subparagraphs 1 (a) (i) and (ii)?

* UNEP/POPS/POPRC.1/1.
** Stockholm Convention, paragraph 8 and Annex D.

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(b) *Persistence*. Is evidence provided on the half-life of the chemical consistent with the criteria listed in Annex D, subparagraph 1 (b) (i) or is some other evidence provided in relation to persistence, as described in Annex D, subparagraph 1 (b) (ii)?

(c) *Bioaccumulation*. Is evidence provided on bioconcentration, bioaccumulation or the logarithmic octanol-water partition coefficient consistent with the criteria set forth in Annex D, subparagraph 1 (c) (i) or is other evidence provided to show that a chemical presents other reasons for concern as described in Annex D, subparagraph 1 (c) (ii), or are monitoring data in biota provided as described in Annex D, subparagraph 1 (c) (iii)?

(d) *Potential for long-range environmental transport*. Are there reports of measured levels of the chemical in locations distant from the source of its release which are of potential concern, as described in Annex D, subparagraph 1 (d) (i), or are monitoring data provided relating to long-range transport, as described in Annex D, subparagraph 1 (d) (ii), or is information given on environmental fate properties or model predictions, as described in Annex D, subparagraph 1 (d) (iii)?

(e) *Adverse effects*. Is evidence provided of direct or potential adverse effects on human health or the environment, as described in Annex D, subparagraphs 1 (e) (i) and (ii) respectively?

(f) *Reasons for concern*. Does the proposal contain a statement of the reasons for concern and the need for global control as described in Annex D, paragraph 2?

(g) *Additional information*. Is additional information provided to support the evaluation of the proposal as described in Annex D, paragraph 3?

5. Where information or the source of information was considered ambiguous or inaccessible, the Secretariat sought clarification from the proponent.

6. The Secretariat assembled for each proposal a verification dossier containing a conclusion as to whether or not the proposal provided the information specified in Annex D. Those dossiers are reproduced in the annex to the present note.

# Annex

## Pentabromodiphenyl ether (pentaBDE) proposal (Norway)

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| **1 (a) Chemical identity** | (i) Names, CAS number, etc. | The CAS chemical names and registry numbers are provided for all major components of the commercial mixtures. Common and trade names are provided for "commercial" pentaBDE. |
| | (ii) Structure, isomers, etc. | The CAS chemical name, registry number, molecular weight and the structural formula for the major component of commercial pentaBDE (BDE-99) are provided. Chemical names and molecular formulae are provided for all other components, but not the molecular weights. |
| **1 (b) Persistence** | (i) Evidence of half-life greater than… **or** | Persistence in aerobic sediment and water is greater than the 6-month and 2-month criteria (respectively) for both the major components of pentaBDE. Persistence in soil is close to the 6-month criterion. |
| | (ii) Evidence that it is otherwise sufficiently persistent. | Not required (however, evidence is provided that pentaBDE residues have persisted decades in marine sediments). |
| **1 (c) Bioaccumulation** | (i) Evidence of BCF/BAF greater than… **or** | Evidence is provided that the BCF value for commercial pentaBDE in carp is 27,400, well above the criterion. No BAF is provided. The logKow for all components of the commercial mixture is above 5. |
| | (ii) Evidence of other reasons for concern **or** | Evidence is provided that tetrabrominated and pentabrominated diphenyl ethers have very high bioaccumulation potential and that they biomagnify. |
| | (iii) Monitoring data indicating bioaccumulation potential. | Evidence is provided of biomagnification in Baltic, Atlantic and Arctic species. |
| **1 (d) Potential for long-range environmental transport** | (i) Measured levels of concern in distant locations **or** | Evidence is provided that increasing concentrations of tetrabromo - and pentabromodiphenyl ethers have been found in Arctic whales. |
| | (ii) Monitoring data showing transfer may have occurred **or** | Evidence is provided of components of commercial pentaBDE in air samples in remote locations (Arctic). |
| | (iii) Environmental fate properties/models demonstrating the potential for transport. | Vapour pressures for components of commercial pentaBDE range from $4.7 \times 10^{-5}$ to $9.6 \times 10^{-8}$ Pa. Half-life values in air range from 10 to 20 days. |
| **1 (e) Adverse effects** | (i) Evidence of adverse effects **or** | No human or ecosystem evidence is provided. |
| | (ii) Toxicity or ecotoxicity data which indicate potential for damage. | Evidence of laboratory animal toxicity is provided (liver toxicity and developmental neurotoxicity, and also immunotoxicity). |

**2. Statement of concern**

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| A statement of the reasons for concern is provided (see document UNEP/POPS/POPRC.1/5). |

**3. Additional information**

- Environmental Health Criteria (EHC) 162: Brominated Diphenyl Ethers. IPCS, 1994.
- Risk Assessment Report for Diphenyl Ether, Pentabromo Derivative (Pentabromodiphenyl ether), Final Report of August 2000, European Commission, 2000.
- Brominated Flame Retardants. Report 5065 (author, C.A. de Wit), Swedish Environmental Protection Agency, 2000.

Supporting documentation for the pentaBDE proposal also included an extensive 50 pages of "additional information" citing over 100 references.

**Secretariat evaluation**

The proposal identifies the chemical as required under Annex D, subparagraph 1 (a) and provides information on the chemical relating to the screening criteria set forth in Annex D, subparagraphs 1 (b) to (e). It includes a statement of the reasons for concern and the need for global control. Additional information, in the form of a review paper developed for the proposal, was provided. The Secretariat is satisfied that the proposal contains the information specified in Annex D.

# Chlordecone proposal (European Union)

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| **1 (a) Chemical identity** | (i) Names, CAS number, etc. | The CAS chemical name and registry number, synonyms, trade names and European Commission registration number are provided. |
| | (ii) Structure, isomers, etc. | The structural formula, molecular formula and molecular weight are provided. |
| **1 (b) Persistence** | (i) Evidence of half-life greater than… **or** | Persistence in soil is greater than the 6-month criterion. |
| | (ii) Evidence it is otherwise sufficiently persistent. | Not required (however, evidence is provided that it is not expected to hydrolyse/biodegrade and that photodegradation is not significant). |
| **1 (c) Bioaccumulation** | (i) Evidence of BCF/BAF greater than… **or** | Evidence that BCF values in three aquatic species exceed the 5,000 criterion. The logKow is between 4.5 and 6.0. |
| | (ii) Evidence of other reasons for concern **or** | Not provided. |
| | (iii) Monitoring data indicating bio-accumulation potential. | Not provided. |
| **1 (d) Potential for long-range environmental transport** | (i) Measured levels of concern in distant locations **or** | Not provided. |
| | (ii) Monitoring data showing transfer may have occurred **or** | Atmospheric transport of Chlordecone has been reported. |
| | (iii) Environmental fate properties/models demonstrating the potential for transport.. | A vapour pressure of under $3 \times 10^{-5}$ Pa, insignificant photodegradation and a half-life in air of up to 50 years are given as evidence that the potential for long-range transport is significant. |
| **1 (e) Adverse effects** | (i) Evidence of adverse effects **or** | Evidence is provided of high toxicity to aquatic organisms and some evidence of reproductive effects in terrestrial vertebrates. |
| | (ii) Toxicity or ecotoxicity data which indicate potential for damage. | Evidence is provided of laboratory-animal toxicity following long-term exposure (tremors/neurological signs and liver hypertrophy). Evidence is provided of carcinogenicity in male and female rats and mice. |

**2. Statement of concern**

A statement of the reasons for concern is provided (see document UNEP/POPS/POPRC.1/6).

**3. Additional information**

Supporting documentation includes two extensive reviews for chlordecone:

- Toxicology profile for mirex and chlordecone, US DHHS, 1995.
- Environmental Health Criteria 43: Chlordecone. IPCS, 1990.

**Secretariat evaluation**

The proposal identifies the chemical as required under Annex D, subparagraph 1 (a) and provides information on the chemical relating to the screening criteria set out in Annex D, subparagraphs 1 (b) to (e). It includes a statement of the reasons for concern and the need for global control. Additional information in the form of a national and an international review was provided. The Secretariat is satisfied that the proposal contains the information specified in Annex D.

## Hexabromobiphenyl (HBB) proposal (European Union)

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| **1 (a) Chemical identity** | (i) Names, CAS number, etc. | The CAS chemical name and registry number and trade name for HBB are provided. |
| | (ii) Structure, isomers, etc. | The structural formula, chemical formula and molecular weight for HBB are provided. |
| **1 (b) Persistence** | (i) Evidence of half-life greater than… **or** | Not provided. |
| | (ii) Evidence it is otherwise sufficiently persistent. | Evidence is provided that polybrominated biphenyls (PBBs) in general are persistent under field conditions. No significant decline in PBB levels were reported in river sediment following termination of PBB production. Evidence is provided that PBBs are resistant to microbial degradation. |
| **1 (c) Bioaccumulation** | (i) Evidence of BCF/BAF greater than… **or** | Evidence is provided that the BCF value in minnows exceeds the 5,000 criterion. The logKow is between 6.4 and 7.0. |
| | (ii) Evidence of other reasons for concern **or** | Not provided. |
| | (iii) Monitoring data indicating bioaccumulation potential… | Not provided. |
| **1 (d) Potential for long-range environmental transport** | (i) Measured levels of concern in distant locations **or** | Evidence is provided that PBBs have been reported in Arctic mammals. |
| | (ii) Monitoring data showing transfer may have occurred **or** | Not provided. |
| | (iii) Environmental fate properties/models demonstrating the potential for transport. | HBB has a vapour pressure of $6.9 \times 10^{-9}$ Pa. Specific information on its photodecomposition in air is not reported. Evidence of PBB in the Arctic is suggestive of transport and persistence of HBB. |
| **1 (e) Adverse effects** | (i) Evidence of adverse effects **or** | No evidence is provided of adverse effects on human health or on the environment. IARC considers HBB a possible human carcinogen based on laboratory animal studies. |
| | (ii) Toxicity or ecotoxicity data which indicate potential for damage. | Evidence of laboratory animal toxicity and carcinogenicity following long-term exposure to PBBs. |

**2. Statement of concern**

A statement of the reasons for concern is provided (see document UNEP/POPS/POPRC.1/7).

**3. Additional information**

Supporting documentation includes one extensive review for polybrominated biphenyls:

- Environmental Health Criteria 152: Polybrominated biphenyls, IPCS, 1994

**Secretariat evaluation**

The proposal identifies the chemical as required under Annex D, subparagraph 1 (a) and provides information on the chemical relating to the screening criteria set forth in Annex D, subparagraphs 1 (b) to (e). It includes a statement of the reasons for concern and the need for global control. Additional information, in the form of an international review, was provided. The Secretariat is satisfied that the proposal contains the information specified in Annex D.

# Lindane (gamma hexachlorocyclohexane) proposal (Mexico)

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| **1 (a) Chemical identity** | (i) Names, CAS number, etc. | The CAS chemical name, CAS registry number and common/trade names are provided. |
| | (ii) Structure, isomers, etc. | The structural formula for hexachlorocyclohexane and its gamma isomer (Lindane), molecular formula and molecular weight are provided. |
| **1 (b) Persistence** | (i) Evidence of half-life greater than… **or** | Persistence in water is greater than the 2-month criterion and persistence in soil is greater than the 6-month criterion. |
| | (ii) Evidence it is otherwise sufficiently persistent. | Not required (however, evidence is provided that it is not readily degraded by light and degraded very slowly by microbial action). |
| **1 (c) Bioaccumulation** | (i) Evidence of BCF/BAF greater than… **or** | Evidence is provided that the log BCF value can be as high as 3.85, the log BAF is 4.1 and the logKow is 3.5. Those values do not meet the criteria set in Annex D, subparagraph 1 (c) (i). |
| | (ii) Evidence of other reasons for concern **or** | Evidence is provided that Lindane is considered highly toxic to some aquatic species. Its beta isomer accumulates more rapidly and bioconcentrates to higher levels in the environment. |
| | (iii) Monitoring data indicating bio-accumulation potential. | Evidence is provided that Lindane has been found accumulating in aquatic species and marine mammals far from its site of manufacture and use. |
| **1 (d) Potential for long-range environmental transport** | (i) Measured levels of concern in distant locations **or** | Evidence is provided that Lindane has been found accumulating in aquatic species and marine mammals far from its site of manufacture and use. |
| | (ii) Monitoring data showing transfer may have occurred **or** | Evidence is provided that Lindane is routinely measurable in Arctic air, ice pack, sea water and freshwater. |
| | (iii) Environmental fate properties/models demonstrating the potential for transport. | A vapour pressure of $3.8 \times 10^{-3}$ Pa, insignificant photodegradation and a half-life in air of 2.3 to 13 days are given as evidence that the potential for long-range transport is significant. Estimated annual airborne deposition in the Arctic is 13,000 kg. |
| **1 (e) Adverse effects** | (i) Evidence of adverse effects **or** | Evidence is provided of high toxicity to some aquatic organisms. |
| | (ii) Toxicity or ecotoxicity data which indicate potential for damage. | Evidence is provided of laboratory-animal toxicity following acute exposures (central nervous system signs, convulsions, respiratory failure, pulmonary oedema and dermatitis) and long-term exposure (convulsions, effects on liver, kidney and reproductive organs, impaired immune system). Evidence is provided of carcinogenicity in mice. |

**2. Statement of concern**

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| A statement of the reasons for concern is provided (see document UNEP/POPS/POPRC.1/8). |

**3. Additional information**

Supporting documentation includes three reviews for Lindane:

- National Diagnostic Report on Lindane, Mexican National Institute of Ecology (INE), 2004. (www.ine.gob.mx/dgicurg/download/Proyectos-2003/EL_LINDANO_EN_MEXICO.pdf)
- Technical Review Report on Lindane, UNECE, 2004 (www.unece.org/env/popsxg/docs/2004/Dossier_Lindane.pdf )
- (Draft) Decision Document on Lindane, Commission for Environmental Cooperation, 2000. (www.cec.org/files/pdf/POLLUTANTS/linddd_en.pdf )

An additional review:

Toxicological Profiles for Hexachlorocyclohexanes (HCH), US-ATSDR, 2003 (www.atsdr.cdc.gov/toxprofiles/tp43.html )

**Secretariat evaluation**

The proposal identifies the chemical as required by Annex D, subparagraph 1 (a) and provides information on the chemical relating to the screening criteria set out in Annex D, subparagraphs 1 (b) to (e). It includes a statement of the reasons for concern and the need for global control. Additional information, in the form of national and international reviews, was provided. Other international and domestic reviews are available. The Secretariat is satisfied that the proposal contains the information specified in Annex D.

# Perfluorooctane sulfonate (PFOS) proposal (Sweden)

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| **1 (a) Chemical identity** | (i) Names, CAS number, etc. | The CAS chemical name, synonyms and trade names for PFOS are provided. As a fully fluorinated anion, PFOS does not have a CAS number. The proposal covers a list of 96 PFOS-related substances for which CAS numbers are provided along with their chemical names. |
| | (ii) Structure, isomers, etc. | The structural formula for the PFOS anion is provided, and also for the related family of perfluoroalkyl sulfonates (PFAS). |
| **1 (b) Persistence** | (i) Evidence of half-life greater than… **or** | Persistence measured as half-life in water and under light was 41 years and 3.7 years respectively. No biodegradation was found in anaerobic and aerobic tests. |
| | (ii) Evidence it is otherwise sufficiently persistent. | Evidence is provided of high levels of PFOS in many species, including several in locations remote from the site(s) of manufacture and use. |
| **1 (c) Bioaccumulation** | (i) Evidence of BCF/BAF greater than… **or** | PFOS is both lipophobic and hydrophobic and accumulates bound to protein, not fat. Its BCF in sunfish (whole body) is 2,796 and in trout (plasma) 3,100: neither value exceeds the Annex D criteria. The logKow for PFOS is not measurable. |
| | (ii) Evidence of other reasons for concern **or** | Evidence is provided that the biomagnification potential as measured in top-of-the-food-chain species is very large (e.g., from seals to polar bears, the BMF is greater than 160). |
| | (iii) Monitoring data indicating bioaccumulation potential. | Evidence is provided of extensive monitoring in a wide range of species. Levels in a variety of aquatic species and birds are reported to reach mg/kg bodyweight levels. |
| **1 (d) Potential for long-range environmental transport** | (i) Measured levels of concern in distant locations **or** | Evidence is provided that there is widespread contamination of species remote from the sites of manufacture or use. |
| | (ii) Monitoring data showing transfer may have occurred **or** | Not provided. Assumed to be transported over long ranges bound to particles. |
| | (iii) Environmental fate properties/models demonstrating the potential for transport. | Vapour pressure for the potassium salt of PFOS is $3.31 \times 10^{-4}$ Pa. Evidence is provided that other PFOS-containing substances have considerably higher vapour pressures. Half-life values in air probably exceed 2 days. |
| **1 (e) Adverse effects** | (i) Evidence of adverse effects **or** | No human or ecosystem evidence is provided. |
| | (ii) Toxicity or ecotoxicity data which indicate potential for damage. | Evidence of laboratory-animal toxicity in monkeys and rats (gastrointestinal lesions and organ weight loss, infant mortality, inhibition of lung maturation). No-effect levels were in the submilligram range. Evidence of moderate acute toxicity in controlled studies with fish, shrimp and algae. |

**2. Statement of concern**

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| A statement of the reasons for concern is provided (see document UNEP/POPS/POPRC.1/9). |

**3. Additional information**

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| Supporting documentation for PFOS and compounds which contain PFOS is provided in a report submitted together with the proposal. The report provides information on recent environmental levels, PFOS-containing compounds, production/use/emissions data, socio-economic factors, etc. The supporting documentation mentioned includes :<br>• Hazard Assessment of Perfluorooctane Sulfonate and its Salts, OECD, 2002.<br>• Perfluorooctane Sulfonate: Risk Assessment Strategy and Analysis of Advantages and Drawbacks, United Kingdom, 2004.<br>• Environmental Risk Evaluation Report: Perfluorooctane sulfonate (PFOS), UK, 2004. |

**Secretariat evaluation**

The proposal identifies the chemical and related compounds as required under Annex D, subparagraph 1 (a) and provides information relating to the screening criteria set forth in Annex D, subparagraphs 1 (b) to (e). It includes a statement of the reasons for concern and the need for global control. Additional information, in the form of a review paper developed for the proposal and other national and international supporting documents, was provided. The Secretariat is satisfied that the proposal contains the information specified in Annex D.