

Annex F Questionnaire (one per chemical)

Chemical name (as used by the POPs Review Committee (POPRC))

Pentachlorobenzene (PeCB)

Synonyms: 1,2,3,4,5-pentachlorobenzene; Pentachlorobenzene; PCB; PeCB; QCB; quintochlorobenzene

CAS Registry Number: 608-93-5

EINECS Number: 210-172-0

Explanatory note:

1. This chemical is undergoing a risk management evaluation. It has already satisfied the screening criteria set out in paragraph 4 (a) of Article 8 of the Convention. A risk profile has also been completed for this chemical in accordance with paragraph 6 of Article 8 and with Annex E to the Convention.

Introductory information

Name of the submitting Party/observer

NGO Observer: Environmental Health Fund on behalf of the International POPs Elimination Network (IPEN)

Contact details (name, telephone, e-mail) of the submitting Party/observer)

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Date of submission

5 February 2008

Additional Annex E information

(i) Production data, including quantity and location

(ii) Uses

(iii) Releases, such as discharges, losses and emissions

Explanatory note:

2. This information was requested for preparation of the risk profile in accordance with Annex E of the Convention. The POPRC would like to collect more information on these items. If you have additional or updated information, kindly provide it.

A. Efficacy and efficiency of possible control measures in meeting risk reduction goals (provide summary information and relevant references):

(i) Describe possible control measures

Pentachlorobenzene (PeCB) should be listed in Annex A and Annex C without exemptions.

Annex A listing: Most of the countries who submitted information to the Secretariat reported no intentional production or use of PeCB, however it cannot be excluded that PeCB may still be produced or used in some countries.¹ In addition, listing in Annex A without exemptions would prevent re-introduction of PeCB for intentional uses. The Committee used this rationale to recommend listing chlordecone in Annex A.²

Annex C listing: The largest current source of PeCB appears to be as an unintentional byproduct of incomplete combustion.³ An Annex C listing would subject PeCB to the measures under Article 5 of the Convention and establish the goal of continuing minimization and, where feasible, ultimate elimination of PeCB emissions.⁴ This would include an obligation to promote Best Available Techniques (BAT) and Best Environmental Practices (BEP) for PeCB sources and to require BAT for some sources taking into account the current guidelines BAT/BEP Guidelines.⁵ Significant sources of PeCB releases that are not contained in Annex C, Part II or Part III should be listed.

(ii) Technical feasibility

Since deliberate production of PeCB appears to have ended, feasible alternatives for its previous uses have already been implemented without cost implications. The primary unintentional sources listed in the Risk Profile include barrel burning of household waste, municipal solid waste incineration, hazardous waste incineration, and magnesium production.⁶ The BAT/BEP guidelines provide technically feasible measures for avoiding or minimizing releases of PeCB and other unintentionally-produced POPs.

(iii) Costs, including environmental and health costs

Alternatives for PeCB have already been implemented without cost implications. The cost of measures required to meet Convention obligations for the unintentionally-

¹ Risk profile on pentachlorobenzene UNEP/POPS/POPRC.3/20/Add.7

http://www.pops.int/documents/meetings/poprc/chem_review/PeCB/PeCB_RiskProfile_e.pdf

² Risk management evaluation on chlordecone UNEP/POPS/POPRC.3/20/Add.2

http://www.pops.int/documents/meetings/poprc/chem_review/Chlordecone/Chlordecone_RME_e.pdf

³ Risk profile on pentachlorobenzene UNEP/POPS/POPRC.3/20/Add.7

http://www.pops.int/documents/meetings/poprc/chem_review/PeCB/PeCB_RiskProfile_e.pdf

⁴ http://www.pops.int/documents/convtext/convtext_en.pdf

⁵ Revised draft guidelines on best available techniques and provisional guidance on best environmental practices relevant to Article 5 and Annex C of the Stockholm Convention on Persistent Organic Pollutants http://www.pops.int/documents/guidance/batbep/batbepguide_en.pdf

⁶ Risk profile on pentachlorobenzene UNEP/POPS/POPRC.3/20/Add.7

http://www.pops.int/documents/meetings/poprc/chem_review/PeCB/PeCB_RiskProfile_e.pdf

produced POPs already listed in the Convention (dioxins, furans, PCBs, HCB) should also address PeCB emissions without adding extra cost.

Explanatory notes:

3. If relevant, provide information on uses for which there may be no suitable alternative or for which the analysis of socio-economic factors justify the inclusion of an exemption when considering listing decisions under the Convention. Detail the negative impacts on society that could result if no exemption were permitted.
4. “Risk reduction goals” could refer to targets or goals to reduce or eliminate releases from intentional production and use, unintentional production, stockpiles, wastes, and to reduce or avoid risks associated with long-range environment transport.
5. Provide the costs and benefits of implementing the control measure, including environmental and health costs and benefits.
6. Where relevant and possible “costs” should be expressed in US dollars per year.

B. Alternatives (products and processes) (provide summary information and relevant references):

(i) Describe alternatives

In the past, PeCB has been found in a variety of products including PCBs, dyestuff carriers, pesticides, pentachlorophenol used for wood treatment, flame retardants and others.⁷ Alternatives for intentional uses of PeCB and uses where PeCB is found as a contaminant could help reduce PeCB emissions. These are discussed below.

PCBs

The presence of PeCB in PCBs will be addressed when Parties address PCBs under Convention requirements.⁸

Dyestuff carriers

The intentional use of PeCB in dyestuff carriers in Canada has been discontinued and apparently substituted.⁹

Impurity in pesticides

PeCB is present as an impurity in pentachloronitrobenzene (quintozene), endosulfan, chlorpyrifos-methyl, atrazine, and clopyralid.¹⁰ Restrictions or controls on the manufacture and/or use of these pesticides have the effect of reducing PeCB emissions.

Quintozene was banned in the EU in 1991 and is not registered for use in Burkina Faso, Cameroon, Cape Verde, Chad, Gambia, Madagascar, Niger, Tanzania, Uganda, India, Sri Lanka, and Belize.^{11 12}

⁷ Risk profile on pentachlorobenzene UNEP/POPS/POPRC.3/20/Add.7

http://www.pops.int/documents/meetings/poprc/chem_review/PeCB/PeCB_RiskProfile_e.pdf

⁸ Stockholm Convention Article 3 and Part II of Annex A

http://www.pops.int/documents/convtext/convtext_en.pdf

⁹ Environment Canada, Chemicals Control Branch, Risk management strategy for pentachlorobenzene (QCB) and tetrachlorobenzenes (TeCBS), June 2005

¹⁰ Risk profile on pentachlorobenzene UNEP/POPS/POPRC.3/20/Add.7

http://www.pops.int/documents/meetings/poprc/chem_review/PeCB/PeCB_RiskProfile_e.pdf

The EU banned atrazine in 2003.¹³ Atrazine is not registered for use in Burkina Faso, Cameroon, Cape Verde, Chad, Gambia, Madagascar, Niger, Tanzania, Uganda, India, New Zealand, Philippines, and Canada.¹⁴

Countries that have banned endosulfan include Bahrain, Belize, Cambodia, Colombia, Cote d'Ivoire, Denmark, Germany, Jordan, Kuwait, Malaysia, Netherlands, Norway, Oman, Philippines, Qatar, Saudi Arabia, Singapore, St Lucia, Sri Lanka, Sweden, Syria, and United Arab Emirates.¹⁵ Endosulfan is effectively banned in all the European Union countries, as it was not included in Annex 1 of Council Directive 91/414. Greece, Spain, Italy and Poland were to phase it out by June 30, 2007 and Romania by December 31, 2007.¹⁶ Endosulfan is also banned in the Indian State of Kerala.¹⁷

Chlorpyrifos, also known as Dursban was banned for home and garden use in the USA in June 2000.¹⁸ Chlorpyrifos – methyl is not registered for use in Cameroon, Tanzania, Uganda, New Zealand, Philippines, and Canada.¹⁹

Clopyralid was banned in 2002 in the USA State of Washington for use on lawns and turf to prevent contamination of compost.²⁰ Clopyralid is not registered for use in Burkina

¹¹ 79/117/EEC (1991) (00/816)

¹² http://www.pesticideinfo.org/Detail_ChemReg.jsp?Rec_Id=PC35123

¹³ Commission E. Review report for the active substance atrazine; Finalized in the Standing Committee on the Food Chain and Animal Health at its meeting on 3 October 2003 in support of a decision concerning the non-inclusion of atrazine in Annex I of Directive 91/414/EEC and the withdrawal of authorisation for plant protection products containing this active substance: European Commission Health and Consumer Protection Directorate- General; 2003. SANCO/10496/2003-final.

¹⁴ http://www.pesticideinfo.org/Detail_ChemReg.jsp?Rec_Id=PC36034

¹⁵ GEF. 2002. Regionally Based Assessment of Persistent Toxic Substances – Regional Reports. Global Environment Facility, United Nations Environmental Programme. <http://www.chem.unep.ch/Pts/>; ERMA. 2006. Evaluation Sheet. Candidates for Reassessment Priority List: Endosulfan. Environmental Risk Management Authority of New Zealand. <http://www.ermanz.govt.nz>; UNEP/FAO. 2001. PIC Circular XIII. June. <http://www.pic.int/home.php?type=t&id=50>; UNEP/FAO. 2003. PIC Circular XXVIII. December. <http://www.pic.int/home.php?type=t&id=50>; UNEP/FAO. 2004. PIC Circular XX. December. <http://www.pic.int/home.php?type=t&id=50>; UNEP/FAO. 2006. PIC Circular XXIV. December. <http://www.pic.int/home.php?type=t&id=50>

¹⁶ AGROW. 2007. Ai uses saved for new EU states. *AGROW World Crop Protection News* 512:7. <http://www.agrow.co.uk>

EU. 2005. Commission decision of 2 December 2005 concerning the non-inclusion of endosulfan in Annex I to Council Directive 91/414/EEC and the withdrawal of authorisations for plant protection products containing this active substance. *Official Journal of the European Union* L 217/25. http://eur-lex.europa.eu/LexUriServ/site/en/oj/2005/l_317/l_31720051203en00250028.pdf

UNEP/FAO. 2006. PIC Circular XXIV. December. <http://www.pic.int/home.php?type=t&id=50>

¹⁷ Chelaton J, Sridhar R. Long struggle against endosulfan poisoning wins relief in India. *Pesticides News* (73):3, 2006

¹⁸ CBS News, Dursban banned, EPA halts use of chemical pesticide in homes and gardens, June 2000 <http://www.cbsnews.com/stories/2000/06/01/tech/main201879.shtml>

¹⁹ http://www.pesticideinfo.org/Detail_ChemReg.jsp?Rec_Id=PC35494

²⁰ <http://agr.wa.gov/pestFert/Pesticides/Clopyralid.htm>

Faso, Cameroon, Cape Verde, Chad, Gambia, Madagascar, Niger, Uganda, and the Philippines.²¹

Contaminant in pentachlorophenol

PeCB is a contaminant in pentachlorophenol (PCP), which has been used for wood treatment. Dioxins and furans are also found as contaminants in PCP,²² and measures to control them should also control PeCB. Pentachlorophenol is highly toxic to the liver, thyroid, immune system, reproductive system and the developing organism; usually contains dioxins and furans as impurities; and is listed by US EPA as a probably human carcinogen.²³ Uses of pentachlorophenol in wood treatment are primarily for use in utility industry poles. Alternatives to these uses include recycled steel, concrete, and fiberglass reinforced composite. These alternatives have life spans of 80 – 100 years as compared to 40 – 50 years for pentachlorophenol-treated wood.²⁴ An examination of the use of steel poles as an alternative in Sweden indicated a reuse rate of almost 100%.²⁵ Reinforced concrete produced by centrifugal casting produces poles with gravel or crushed stone and with steel reinforcement. This alternative must consider Stockholm Convention concerns about POPs production from cement kilns. Fiberglass reinforced composite has been commercially implemented and utilizes a filament winding process for manufacturing.²⁶

Unintentional production

Alternatives and methods to reduce unintentional production of PeCB are dealt with under the BAT/BEP Guidelines of the Convention. The BAT/BEP Guidelines include PeCB sources such as open burning, municipal solid waste incineration, hazardous waste incineration, and magnesium production.²⁷

(ii) Technical feasibility

All implemented alternatives appear to be technically feasible and have been used in commercial applications or applied in the case of the BAT/BEP Guidelines.

²¹ http://www.pesticideinfo.org/Detail_ChemReg.jsp?Rec_Id=PC36017

²² See, for example, Environment Canada Overview on Wood Preservation:

http://www.ec.gc.ca/toxics/wood-bois/over/diox_e.htm

²³ Agency for Toxic Substances and Disease Registry (ATSDR), Toxicological profile for pentachlorophenol, US Department of Health and Human Services, September 2001

<http://www.atsdr.cdc.gov/toxprofiles/tp51.pdf>

²⁴ Feldman J, Shistar T. Poison poles – A report about their toxic trail and safer alternatives, National Campaign Against the Misuse of Pesticides, 1997

<http://www.beyondpesticides.org/wood/pubs/poisonpoles/alt.html>

²⁵ as cited in Feldman J, Shistar T. Poison poles – A report about their toxic trail and safer alternatives, National Campaign Against the Misuse of Pesticides, 1997

<http://www.beyondpesticides.org/wood/pubs/poisonpoles/alt.html>

²⁶ as cited in Feldman J, Shistar T. Poison poles – A report about their toxic trail and safer alternatives, National Campaign Against the Misuse of Pesticides, 1997

<http://www.beyondpesticides.org/wood/pubs/poisonpoles/alt.html>

²⁷ Revised draft guidelines on best available techniques and provisional guidance on best environmental practices relevant to Article 5 and Annex C of the Stockholm Convention on Persistent Organic Pollutants http://www.pops.int/documents/guidance/batbep/batbepguide_en.pdf

(iii) Costs, including environmental and health costs

Alternatives to intentional uses of PeCB as well as uses containing PeCB as a contaminant have already been implemented without cost implications. Cost comparisons of alternatives to pentachlorophenol – treated wood poles find that recycled steel poles are slightly more expensive initially (\$383 vs. \$360 in one example) but provide savings since they do not require re-treatment or maintenance.²⁸ In several case studies, recycled steel and concrete proved more cost competitive than fiberglass.

(iv) Efficacy

The existing commercial use of alternatives to intentional uses of PeCB as well as uses containing PeCB as a contaminant indicates their efficacy.

(v) Availability

The existing commercial use of alternatives to intentional uses of PeCB as well as uses containing PeCB as a contaminant indicates their availability.

(vi) Accessibility

Alternatives to intentional uses of PeCB as well as uses containing PeCB as a contaminant appear to be accessible and are already in commercial use.

Explanatory notes:

7. Provide a brief description of the alternative product or process and, if appropriate, the sector(s), use(s) or user(s) for which it would be relevant.
8. If several alternatives could be envisaged for the chemical under consideration, including non-chemical alternatives, provide information under this section for each alternative.
9. Specify for each proposed alternative whether it has actually been implemented (and give details), whether it has only reached the trial stage (again, with details) or whether it is just a proposal.
10. The evaluation of the efficacy should include any information on the performance, benefits, costs, and limitations of potential alternatives.
11. Specify if the information provided is connected to the specific needs and circumstances of developing countries.
12. The evaluation of the risk of the alternative should include any information on whether the proposed alternative has been thoroughly tested or evaluated in order to avoid inadvertently increasing risks to human health and the environment. The evaluation should include any information on potential risks associated with untested alternatives and any increased risk over the life-cycle of the alternative, including manufacture, distribution, use, maintenance and disposal.
13. If the alternative has not been tried or tested, information on projected impacts may also be useful.
14. Information or comments on improving the availability and accessibility of alternatives may also be useful.

²⁸ Feldman J, Shistar T. Poison poles – A report about their toxic trail and safer alternatives, National Campaign Against the Misuse of Pesticides, 1997
<http://www.beyondpesticides.org/wood/pubs/poisonpoles/alt.html>

C. Positive and/or negative impacts on society of implementing possible control measures (provide summary information and relevant references):

(i) Health, including public, environmental and occupational health

Elimination of PeCB through listing in Annex A and Annex C would positively impact human health and the environment by decreasing emissions of a substance that warrants global action. As outlined in the Risk Profile, PeCB has contaminated the environment including humans and food. Despite lack of comprehensive information, the PeCB Risk Profile describes PeCB as moderately toxic to humans and very toxic to aquatic organisms.²⁹ Concerns for human health include the presence of PeCB in breast milk and its accumulation in the placenta.³⁰ If PeCB emissions are not eliminated, then levels in the environment including humans and animals may continue to rise, even in locations distant from production and use. Promoting and requiring BAT/BEP for sources of all unintentional POPs benefits the protection of human health and the environment.

(ii) Agriculture, including aquaculture and forestry

(iii) Biota (biodiversity)

(iv) Economic aspects

Alternatives to intentional uses of PeCB as well as uses containing PeCB as a contaminant have already been implemented without cost implications. The cost implications of measures needed under the BAT/BEP guidelines for the unintentional production of PeCB have already been covered under measures needed for the unintentionally-produced POPs already listed in the Convention (dioxins, furans, PCBs, HCB).

Society may incur some specific costs when materials such as PeCB are removed from the market and when associated wastes and contaminated sites are addressed. The Polluter Pays principle³¹, under which such costs should be internalized by the producer and/or the user, may be applied, but this is seldom done (at least without regulatory assistance). No good estimates are available of the potential cost recovery that can be achieved since the original ‘polluter’ often cannot be identified or is no longer in business. Nonetheless, the Polluter Pays Principle may be applied to legacy problems if the original ‘polluter’ can be identified and if a Party’s regulatory framework permits.

²⁹ Risk profile on pentachlorobenzene UNEP/POPS/POPRC.3/20/Add.7

http://www.pops.int/documents/meetings/poprc/chem_review/PeCB/PeCB_RiskProfile_e.pdf

³⁰ Risk profile on pentachlorobenzene UNEP/POPS/POPRC.3/20/Add.7

http://www.pops.int/documents/meetings/poprc/chem_review/PeCB/PeCB_RiskProfile_e.pdf

³¹ Stockholm Convention Preamble: “Reaffirming Principle 16 of the Rio Declaration on Environment and Development which states that national authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.”

(v) Movement towards sustainable development

Reduction and elimination of PeCB is consistent with sustainable development plans that seek to reduce emissions of toxic chemicals. A relevant global plan is the Strategic Approach to International Chemicals Management (SAICM) that emerged from the World Summit on Sustainable Development.³² Over 100 health and environment ministers agreed to the SAICM which was adopted at a high-level meeting in Dubai in February 2006.³³ SAICM makes the essential link between chemical safety, sustainable development, and poverty reduction.³⁴ The Global Plan of Action of SAICM contains specific measures to support risk reduction that include prioritizing safe and effective alternatives for persistent, bioaccumulative, and toxic substances. The Overarching Policy Strategy of SAICM includes POPs as a class of chemicals to be prioritized for halting production and use and substitution with safer substitutes.

(vi) Social costs

The impact on business and various industrial products associated with transition to PeCB alternatives should have already occurred and no longer be a factor. The societal benefits will be continuing minimization and ultimate elimination of a substance that the Committee has already determined is likely, as a result of its long range environmental transport, to lead to significant adverse human health and/or environmental effects, such that global action is warranted.

Explanatory notes:

15. Socio-economic considerations could include:

- Any information on the impact (if any), costs and benefits to the local, national and regional economy, including the manufacturing sector and industrial and other users (e.g., capital costs and benefits associated with the transition to the alternatives); and impacts on agriculture and forestry;
- Any information on the impact (if any) on the wider society, associated with the transition to alternatives, including the negative and positive impacts on public, environmental, and occupational health. Consideration should also be given to the positive and negative impacts on the natural environment and biodiversity.
- Information should be provided on how control measures fit within national sustainable development strategies and plans.

D. Waste and disposal implications (in particular, obsolete stocks of pesticides and clean-up of contaminated sites) (provide summary information and relevant references):

A listing of PeCB in Annex A and Annex C would subject wastes products or articles containing the substance to Article 6 of the Stockholm Convention and require that they be disposed, "...in a safe, efficient and environmentally sound manner."³⁵ Other wastes involved in the unintentional production of PeCB would be handled under the BAT/BEP Guidelines of the Convention and the measures under Article 5.

³² <http://www.chem.unep.ch/saicm/>

³³ UNEP Press Release, New Global Chemicals Strategy Given Green Light by Governments, 7 February 2006 http://www.chem.unep.ch/saicm/iccm_sec.htm

³⁴ <http://www.chem.unep.ch/saicm/SAICM%20texts/SAICM%20documents.htm>

³⁵ Stockholm Convention on Persistent Organic Pollutants, Article 6

(i) Technical feasibility

(ii) Costs

Explanatory note:

16. Specify if the information provided is connected to the specific needs and circumstances of developing countries.

E. Access to information and public education (provide summary information and relevant references):

Listing PeCB in Annex A will involve control measures that are straight forward to communicate and therefore should be effective and suitable, even in countries that have limited chemical regulatory infrastructure. Listing PeCB in Annex C will involve control measures that are familiar to countries since they already have obligations for unintentionally-produced POPs under the Convention. Efforts made at public awareness-raising on dioxins will effectively include PeCB.

Explanatory note:

17. Please provide details here of access to information and public education with respect to both control measures and alternatives.

F. Status of control and monitoring capacity (provide summary information and relevant references):

Listing PeCB in Annex A would be the most cost effective option in countries that lack the needed infrastructure to adequately monitor production and uses of PeCB since monitoring may require extensive resources and infrastructure that the country does not have. Listing PeCB in Annex C will involve control measures that are familiar to countries since they already have obligations for unintentionally-produced POPs under the Convention. The same capacity development needed to control unintentional POPs that are already part of the country's obligations will apply to control of PeCB.

Explanatory note:

18. With regard to control capacity, the information required is on legislative and institutional frameworks for the chemical under consideration and their enforcement. With regard to monitoring capacity, the information required is on the technical and institutional infrastructure for the environmental monitoring and biomonitoring of the chemical under consideration, not monitoring capacity for alternatives.

G. Any national or regional control actions already taken, including information on alternatives, and other relevant risk management information:

Canada: Added pentachlorobenzene to the Prohibited Toxic Substances List in Schedule 1 and 2 to the Prohibition of Certain Toxic Substances Regulations, 2005.^{36 37}

EU: PeCB is a priority hazardous substance in the EU Water Framework Directive and subject to cessation or phasing out of discharges, emissions and losses in 20 years or less.³⁸

Explanatory notes:

19. Actions or measures taken could include prohibitions, phase-outs, restrictions, cleanup of contaminated sites, waste disposal, economic incentives, and other non-legally binding initiatives.

20. Information could include details on whether these control actions have been cost-effective in providing the desired benefits and have had a measurable impact on reducing levels in the environment and contributed to risk reduction.

H. Other relevant information for the risk management evaluation:

Explanatory notes:

21. The above list of items is only indicative. Any other relevant information for the risk management evaluation should also be provided.

I. Other information requested by the POPRC: Information related to environmental burden caused by intentional use of pentachlorobenzene

Information related to environmental burden caused by unintentional releases of pentachlorobenzene

³⁶ Canada Gazette Part II, Statutory Instruments 2005, Vol 139, No. 19, p1850 – 2221, September 21, 2005
<http://canadagazette.gc.ca/partII/2005/20050921/pdf/g2-13919.pdf>

³⁷ Canada Gazette Part II, Statutory Instruments 2006, Vol 140, No. 24, p1878 – 1959, November 29, 2006
<http://canadagazette.gc.ca/partII/2006/20061129/pdf/g2-14024.pdf>

³⁸ Van de Plassche, E.J., Schwegler, A.M.G.R., Rasenberg, M. and Schouten, A. 2002. Pentachlorobenzene. Dossier prepared for the third meeting of the UN-ECE Ad Expert Group on POPs. Royal Haskoning report L0002.A0/R0010/EVDP/TL
<http://www.unece.org/env/popsxg/docs/2005/EU%20pentachloorbenzeen.pdf>