UNITED
NATIONS

E

Economic and Social Council

Distr.
GENERAL

EB.AIR/WG.5/2002/2
3 July 2002

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR EUROPE

EXECUTIVE BODY FOR THE CONVENTION ON
LONG-RANGE TRANSBOUNDARY AIR POLLUTION

Working Group on Strategies and Review
(Thirty-fourth session, Geneva, 18-20 September 2002)
Item 5 of the provisional agenda

FURTHER ASSESSMENT OF PERSISTENT ORGANIC POLLUTANTS (POPs)

Report by the Chairman of the Expert Group on POPs

Introduction

1. This report presents progress in the work of the Expert Group on POPs since the thirty-third session of the Working Group on Strategies and Review. The expert group held its second meeting in Torun (Poland) on 24-26 October 2001 and its third in Geneva on 5-6 June 2002.

2. Experts from Armenia, Austria, Canada, Czech Republic, Finland, France, Germany, Georgia, Hungary, Italy, Netherlands, Norway, Poland, Republic of Moldova, Slovakia, Sweden, Switzerland, Ukraine, United Kingdom and United States participated in the second and/or third meetings. Representatives from the Meteorological Synthesizing Centre East (MSC-E) of EMEP, the United Nations Environment Programme (UNEP), the World Health Organization (WHO), the European Chemical Industry Council (CEFIC) and the UNECE secretariat also participated.

3. Mr. David STONE (Canada) chaired both meetings.

Documents prepared under the auspices or at the request of the Executive Body for the Convention on Long-range Transboundary Air Pollution for GENERAL circulation should be considered provisional unless APPROVED by the Executive Body.

GE.02-31792

I. BACKGROUND TO THE WORK OF THE EXPERT GROUP

4. According to the work-plan for the implementation of the Convention (ECE/EB.AIR/75, annex VI, item 1.5), the Expert Group is expected to:

(a) Prepare a compendium of available information provided by experts relating to the existing obligations for substances listed in annex I, II or III to the Protocol on POPs, together with an expert judgement on this material;

(b) Prepare a compendium of information provided by national experts on substances not included in the Protocol after technical evaluation of this material.

The Expert Group noted that, in its work, it should take into account the relevant provisions of the Protocol on POPs, in particular the reassessment clauses in annexes I and II, as well as Executive Body decision 1998/2 on information to be submitted and the procedures for adding substances to annexes I, II and III to the Protocol.

5. At its second meeting, the Expert Group decided to prepare a questionnaire on the substances under review. The main objective of the questionnaire was to solicit information from Parties on the use and production of the substances. The questionnaire was sent in early December 2001 to nominated experts or, for Parties for which no experts had been nominated, to the heads of delegation to the Working Group on Strategies and Review. It covered the following substances: PCTs, DDT, DDT as an intermediate to produce dicofol, heptachlor, lindane, ugilec, dicofol, hexachlorobutadiene and short-chained chlorinated paraffins. Full or partial responses were received from 25 Parties: Armenia, Austria, Belgium, Canada, Croatia, Czech Republic, Denmark, Finland, France, Georgia, Germany, Italy, Kazakhstan, Latvia, Monaco, Netherlands, Norway, Poland, Republic of Moldova, Slovakia, Spain, Sweden, Switzerland, United Kingdom and United States.

6. MSC-E supported the work of the Expert Group by providing overviews of its work related to POPs, both concerning POPs included in the Protocol and possible candidate substances. MSC-E invited experts to review the data and modelling results that it had presented in its reports and on its web site (www.msceast.org) and offered to assist Parties in the preparation of substance dossiers. The Expert Group took note of the information presented at the two meeting. It agreed that Parties wishing to propose additional substances to the Protocol might wish to make use of the offer of MSC-E.

7. The Expert Group was also informed about activities of the Task Force on the Health Aspects of Air Pollution, led by the World Health Organization (WHO). The Task Force had conducted a health risk evaluation of POPs that would be presented to the Working Group on Effects in August 2002 (EB.AIR/WG.1/2002/14). The Expert Group recognized that the Task

Force had addressed several of the pollutants that were also covered in its work and that the report would provide a useful complement.

8. The representative of UNEP informed the Expert Group about work done since the adoption of the Stockholm Convention on POPs, in particular in the preparation of the sixth session of the International Negotiating Committee to be held in June 2002. The Task Force took note of the information. It recognized that continued close collaboration in the work under the Protocol on POPs and the Convention on POPs would be useful.

II. PREPARATION FOR THE REVIEW OF THE PROTOCOL AND THE SCHEDULED REASSESSMENTS OF SUBSTANCE-RELATED PROVISIONS

9. At its second and third meetings, the Expert Group discussed draft dossiers for inclusion in a compendium on reassessments related to substances listed in annexes I and II to the Protocol on POPs. The dossiers were based on input provided by Parties through the questionnaire (see para. 5 above), comments provided by experts and other sources. The following substances were covered in the work:

(a) DDT – led by Ms. J. King Jensen, (United States);

(b) DDT in dicofol – led by Mr. E. van de Plassche (Netherlands);

(c) Heptachlor – led by Ms. S. Shaver (United States);

(d) Lindane – led by Ms. I. Hauzenberger, Ms. B. Perthen-Palmisano (Austria) and Mr. M. Herrmann (Germany);

(e) PCT – led by Mr. G. Filyk (Canada); and

(f) Ugilec – led by Mr. M. Herrmann (Germany).

10. The Expert Group expressed its gratitude to the lead experts for their valuable work. It agreed generally on the content of the dossiers. At its third meeting, the Expert Group adopted the summaries and the expert judgements as set out in annex I below. The compendium containing the full dossiers with the information submitted by the national experts that were lead authors for specific substances is published as a separate document.

11. Concerning DDT, the Expert Group noted that annex I to the Protocol foresaw that the review should be conducted in consultation with WHO, Food and Agriculture Organization of the United Nations (FAO) and UNEP. While the lead expert responsible for the dossier had conducted informal consultations in the preparation of the dossier, the Expert Group recognized that formal consultations could only take place once the Protocol had entered into force and its Parties had decided on a review. Such formal consultations should be conducted through the secretariat.

III. SUBSTANCES NOT INCLUDED IN THE PROTOCOL

12. At its second and third meetings, the Expert Group discussed draft dossiers for inclusion in a compendium on substances that may be candidates for inclusion in the Protocol. The dossiers were based on input provided by Parties through the questionnaire (see para. 5 above), comments provided by experts and other sources. The following substances were covered in the work:

(a) Hexachlorobutadiene - led by Mr. E. van de Plassche (Netherlands);

(b) Pentabromodiphenyl ether (PeBDE) – led by Ms. Yla-Mononen (Finland) and Mr. N. Johanssen (Sweden);

(c) Pentachlorobenzene - led by Mr. E. van de Plassche;

(d) Polychlorinated naphthalenes - led by Mr. E. van de Plassche;

(e) Dicofol - led by Mr. E. van de Plassche;

(f) Short-chain chlorinated paraffins – led by Mr. G. Filyk (Canada); and

(g) Pentachlorophenol – led by Mr. M. Borysiewicz, Mr. W. Kolsut and Mr. J. Zurek (Poland).

13. The Expert Group assisted the Parties that had taken the initiative to prepare the dossiers by providing additional information or technical comments. It thanked the lead experts for their valuable contributions. For substances listed in subparagraphs (f) and (g), only preliminary draft dossiers were discussed at the third meeting.

14. After a technical evaluation, the Expert Group agreed on the summaries presented in annex II to this report for the dossiers referred to in subparagraphs (a) to (d) above. It noted, however, that all conclusions presented therein reflected the view of the Parties' experts that prepared the dossiers and not necessarily that of the Expert Group. The compendium with the full dossiers is published separately.

15. For several of the dossiers, the Expert Group advised the lead experts to include more information on a number of topics listed in Executive Body decision 1998/2. This included, for instance, information on socio-economic factors and on environmental and health risks.

16. On the draft dossier on dicofol, a substantial amount of information was submitted shortly before the third meeting of the Expert Group by a company producing the substance. Additional comments were raised during the meeting. The lead expert pointed out that he would need time to review the new information. He offered to finalize the dossier taking into account the comments received and to present a revised draft at a future meeting of the Expert Group.

17. At its second meeting, the Expert Group had noted the interest to consider short-chain chlorinated paraffins as a possible new substance. In response, Mr. G. Filyk (Canada) had offered to prepare an information dossier on this substance. The preliminary results of this work were presented at the third meeting of the Expert Group. The Expert Group provided comments on the first draft of the dossier, and the lead expert offered to finalize the dossier taking into account the comments received and to present a revised draft at a future meeting of the Expert Group.

18. The Expert Group had also noted the interest in further work on pentachlorophenol. After the second meeting, Mr. J. Zurek (Poland) offered to prepare a draft dossier on this substance. The work conducted by Mr. M. Borysiewicz and Mr. W. Kolsut was presented at the third meeting of the Expert Group. The Expert Group provided comments on the first draft of the dossier, and the lead expert offered to finalize the dossier taking into account the comments received and to present a revised draft at a future meeting of the Expert Group.

IV. FURTHER WORK AND TIMETABLE

19. The Expert Group agreed that it would be useful to continue the work on the three dossiers as offered by the respective lead experts. The Expert Group encouraged experts to provide any further comments to the draft dossiers early on in the process and requested its Chairman to set a deadline for comments well before the next meeting.

20. The Expert Group recognized that, in addition to these dossiers, Parties might propose the drawing-up of dossiers on other substances. To plan the work for the fourth meeting, it would be useful to inform the secretariat of the intention to prepare additional dossiers early in the process, preferably prior to the thirty-fourth session of the Working Group on Strategies and Review.

21. The Expert Group tentatively scheduled its fourth meeting to be held in the spring of 2003 at a venue to be determined.

Annex I

SUMMARY OF INFORMATION RELATING TO THE SCHEDULED REASSESSMENTS OF SUBSTANCE-RELATED PROVISIONS IN THE PROTOCOL ON POPS AND ASSOCIATED EXPERT JUDGEMENTS

1. The ad hoc Expert Group prepared a compendium of information provided by experts relating to the existing obligations for substances listed in annex I, II or III to the Protocol on POPs, together with an expert judgement on this material. The full compendium with the information submitted by national experts who were lead authors for specific substances is published as a separate document. This annex provides the summaries and the expert judgements, which were adopted by the Expert Group on POPs at its third meeting on 5-6 June 2002 in Geneva for submission to the Working Group on Strategies and Review at its thirty-fourth session.

A. DDT

Introduction

2. The Protocol on POPs requires that, with a view to eliminating the production of DDT at the earliest opportunity, the Parties shall, no later than one year after entry into force and periodically thereafter as necessary, and in consultation with the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Environment Programme (UNEP), review the availability and feasibility of safer and economically viable alternatives to DDT. Parties are also requested, as appropriate, to promote the commercialization of such alternatives. A dossier was prepared under the leadership of Ms. J. King Jensen (United States).

Production, use and control action

3. In some countries DDT continues to be a tool for the control of malaria, but it may also be used to control other insect-borne diseases such as encephalitis. Malaria kills at least one million people each year, or about 3,000 people a day. According to WHO, nine out of ten cases of malaria occur in sub-Saharan Africa south of the Sahara. Malaria is not a significant health problem in many UNECE countries at this time.

4. Most countries in the UNECE region have ceased the use and production of DDT. During the negotiations for the Protocol on POPs, the Russian Federation requested an exemption to use DDT for encephalitis control. This continued need has not been reconfirmed. In their response to the 2001 POPs questionnaire, Georgia stated that DDT use was banned. Georgia, however, reported that it was aware of, and attempting to control, the unsanctioned use of DDT in coastal

areas, military zones and certain facilities. During the negotiations of the Stockholm Convention on POPs, China, India and the Russian Federation submitted requests to produce DDT for public health purposes and 32 countries requested to use DDT for disease-vector control, including the Russian Federation.

5. WHO, through its Roll Back Malaria initiative, has the international mandate to assist countries to reduce their reliance on DDT. WHO also has an international testing programme in place to promote and coordinate the testing and evaluation of new pesticides for public health use.

6. There is a general discussion on various malaria-control strategies that include, inter alia, vector control, disease control, use of insecticide-treated bednets and malaria vaccines. A cost comparison of DDT and alternative insecticides for vector control was published in 2000 and is included in the dossier. Based on 1998/99 data, the cost ratios (where DDT=1) vary from 1.4 for malathion to 18.7 for propoxur. These ratios do not include shipping charges or operational expenses.

7. Information is provided on a report that analyses the economics of malaria control in sub-Saharan Africa. Information is also provided on two Global Environment Facility projects to phase out DDT in Mexico, Central America, and the other in Africa, as well as a World Bank loan to India to strengthen its malaria control programme.

8. Safer and economically viable alternatives approaches to DDT continue to be needed for public health protection from diseases such as malaria.

Expert judgement

9. Based on informal consultation with WHO, FAO and UNEP, and information received from Parties to the Convention on Long-range Transboundary Air Pollution, some chemical and non-chemical alternatives to DDT are available, but are not practical for many countries, especially countries outside the UNECE region. Obstacles associated with the cost, market access, effectiveness, safety, training, etc. must be overcome before such alternatives will be effective and widely available to countries for use. Safe and economically viable alternative approaches to the use of DDT continue to be needed for disease vector control.

B. DDT in dicofol

Introduction

10. The Protocol on POPs requires that the use of DDT as a chemical intermediate to produce dicofol should be reassessed no later than two years after the date of entry into force of the

Protocol. The introductory paragraph of annexes I and II to the Protocol excludes substances such as DDT when they occur, inter alia, as a site-limited intermediate in the manufacture of other substances such as dicofol. A dossier has been prepared under the leadership of Mr. E. van de Plassche (Netherlands).

Production, use and control action

11. For the questionnaire sent to the Parties at the end of 2001, 24 Parties responded on the use of DDT to produce dicofol.

12. In the UNECE region there are three known producers:

(a) For one company in Spain information is available: DDT is produced in a continuous process as a on-site intermediate to produce dicofol in a closed system;

(b) For the other two producers, in Spain and Israel, no information is available on the production process.

13. In several countries regulations exist with respect to the DDTr (DDT and related substances) content of commercial dicofol. In the United States, Canada and the European Community, the limit of DDTr is <0.1%.

14. Outside the UNECE region, countries producing dicofol include China, Brazil and India, but no information is available on the manufacturing process.

Expert judgement

15. It is technically feasible to produce dicofol in a closed system process in which DDT is produced as a site-limited chemical intermediate. The use of DDT allowed within the Protocol as a chemical intermediate to produce dicofol is therefore technically no longer necessary.

C. Heptachlor

Introduction

16. The Protocol on POPs requires the elimination of heptachlor production and restricts its use to the control of fire ants in closed industrial electrical junction boxes. The Protocol also requires that the use of heptachlor should be re-evaluated no later than two years after the date of entry into force. A dossier was prepared under the leadership of Ms. S. Shaver (United States).

Production, use and control action

17. The United States originally requested the use exemption but reported that it had subsequently cancelled this heptachlor use. In its place, the United States has regulated alternatives that contain deltamethrin or dichlorvos. Responses to questionnaires sent in 2000 and 2001 to Parties to the Convention on Long-range Transboundary Air Pollution indicate that there is currently no known production or use of heptachlor within the UNECE region. Seven countries (outside the UNECE region) have requested heptachlor use exemptions during the negotiations of the Stockholm Convention on POPs. These apply to several uses but not to the use for underground electrical junction boxes.

Expert judgement

18. The United States has indicated that it no longer needs the heptachlor exemption for the control of fire ants in closed industrial electrical junction boxes. No country has indicated a need for the exemption in the Protocol. These points should be taken into account when the Parties to the Protocol undertake the review of the exemption in accordance with the requirements of the Protocol.

D. Lindane

Introduction

19. The Protocol on POPs requires that all restricted uses of lindane should be reassessed under the Protocol no later than two years after entry into force. A dossier was prepared under the leadership of Ms. I. Hauzenberger, Ms. B. Perthen-Palmisano (Austria) and Mr. M. Herrmann (Germany).

Production, use and control action

20. Under the Protocol on POPs, technical HCH is restricted to use as an intermediate in chemical manufacturing and lindane (products in which at least 99% of the HCH isomer is in the gamma form) is restricted to the following six uses:

(a) Seed treatment;
(b) Soil applications directly followed by incorporation into the topsoil surface layer;
(c) Professional remedial and industrial treatment of lumber, timber and logs;
(d) Public health and veterinary topical insecticide;
(e) Non-aerial application to tree seedlings, small-scale lawn use, and indoor and outdoor use for nursery stock and ornamentals; and

(f) Indoor industrial and residential applications.

21. In order to obtain updated information on the production, use and regulatory actions of lindane, a questionnaire was prepared and sent to 50 Parties or Signatories to the Convention. Responses on lindane were received from: Armenia, Austria, Belgium, Canada, Croatia, Czech Republic, Denmark, Finland, France, Georgia, Germany, Italy, Kazakhstan, Latvia, Monaco, Netherlands, Norway, Poland, Republic of Moldova, Slovakia, Spain, Sweden, Switzerland, United Kingdom and United States.

22. Generally, the importance of lindane as an insecticide has steadily decreased in the UNECE region. Figures for production and use confirm this trend, which started in the 1980s. Based on the questionnaire circulated in 2001, the following conclusions regarding the restricted uses of lindane can be drawn:

(a) The use of non-aerial application to tree seedlings, small-scale lawn use, and indoor and outdoor use for nursery stock and ornamentals is no longer relevant;

(b) Lindane was and is used as a seed dressing in crops. It is still used for this purpose in Canada, United Kingdom and the United States. Canada intends to phase out all uses of lindane under the Pest Control Products Act by 31 December 2004. Also the European Union is phasing out all agricultural uses in 2002 by Commission Decision 2000/801/EC of 20 December 2000 concerning the non-inclusion of lindane in Annex I to Council Directive 91/414/EEC;

(c) No responding country reported soil applications directly followed by incorporation into the topsoil surface layer;

(d) Current use of lindane for professional remedial and industrial treatment of lumber, timber and logs is reported for France, Spain and the United Kingdom. In the United Kingdom all 'non-agricultural' products containing lindane are undergoing revocation;

(e) Lindane continues to be used to control ectoparasites of humans (head lice, scabies) and of domestic animals. Lindane-containing preparations are allowed to be marketed for these purposes in Austria, Croatia, Czech Republic, France, Germany, Canada, Switzerland, United Kingdom and United States. With respect to human health, Germany reported the use of lindane for pest control on refuse pits;

(f) In four countries (France, Germany, Spain, United Kingdom), lindane is used for indoor industrial and residential applications.

23. Within the European Union lindane might be evaluated for biocidal applications under the

Biocidal Products Directive 98/8/EC.

24. Alternatives for lindane can be identified as a result of the survey. Examples can be found in the dossier prepared by Austria and Germany.

Expert judgement

25. Lindane was widely used as an insecticide until the 1990s in almost all countries of the UNECE region. Since that time, production as well as marketed volumes have steadily decreased. Since no ongoing production could be identified for any Party responding to the questionnaire in 2001, it is concluded that all continuing uses of lindane products are based either on imported active ingredient or on domestic stockpiles.

26. Under the Protocol on POPs, lindane is restricted to six uses. Two of these may now be considered as no longer relevant: soil applications directly followed by incorporation into the topsoil surface layer, and non-aerial application to tree seedlings, small-scale lawn use, indoor and outdoor use for nursery stock and ornamentals. Lindane is used to some extent as a seed dressing in crops. Also its application as wood preservative for professional remedial and industrial treatment of lumber, timber and logs is ongoing. Indoor industrial and residential application are still relevant in some Parties. Lindane is still used as a pharmaceutical for public health purposes and as veterinary topical insecticide.

E. Polychlorinated terphenyls

Introduction

27. The Protocol on POPs requires that Parties reassess the production and use of polychlorinated terphenyls (PCTs) by 31 December 2004. A dossier was prepared under the leadership of Mr. G. Filyk (Canada).

28. In the European Union, PCTs are included in certain legislation together with ugilec under the definition of polychlorinated biphenyls (PCBs). However, Canada and the United States have chemically specific definitions, such that "PCB" includes only isomers of polychlorinated biphenyls and "PCT" includes only isomers of polychlorinated terphenyls.

29. The physical and chemical properties of PCTs are very close to those of PCBs. Theoretically there are over 8000 different congeners of PCTs.

Production, use and control action

30. Polychlorinated terphenyls were produced by four Parties: France, Germany, Italy and the United States. The only other known historical producer of PCTs is Japan. Total global production of PCTs is estimated to have been 60,000 metric tons between 1955 and 1980. Production quantities of PCTs were 15-20 times smaller than those of the chemically similar PCBs. Production of PCTs is not known to have occurred anywhere since the early 1980s, and there is no known current production of PCTs in the UNECE region.

31. Polychlorinated terphenyls are known to have been used historically by several Parties. While there is not sufficient information about other countries, historical PCT use is possible or even probable, given its wide range of applications and its use as a PCB substitute in many products up to the 1970s and longer.

32. PCTs are not known to be currently used in the UNECE region. However, similar to PCBs, they may be found in some countries in old electrical capacitors, transformers and other equipment, or as constituents or contaminants of some products.

33. According to their responses to the questionnaire, Parties in North America, Western Europe, the Czech Republic, Republic of Moldova and Poland have taken or are taking measures to directly prohibit or effectively control the production and use of PCTs, and to ensure the destruction or disposal of PCTs in an environmentally sound manner, and to ensure that the transboundary movement of PCTs is conducted in an environmentally sound manner. In these countries, measures to destroy and/or dispose of PCTs are similar to measures to destroy and/or dispose of PCBs. However, similar control actions for PCTs, including measures to ensure that destruction, disposal or transboundary movement of PCTs is conducted in an environmentally sound manner, either do not exist or are unknown for other UNECE countries.

34. PCTs are controlled in a number of international agreements: the Red Tier List of Wastes of the Organisation for Economic Co-operation and Development (OECD); the Rotterdam Convention on Prior Informed Consent (PIC); the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; and the Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal.

Expert judgment

35. Production of polychlorinated terphenyls had ceased in UNECE countries by the early 1980s, and there is no known current production of PCTs in the UNECE region. PCTs were used historically in several countries, and currently known uses are restricted to applications from this

historical use.

36. Since PCTs are no longer produced or used, the remaining issues are whether controls are in place on their production and use, and whether PCTs from past production and use are subject to environmentally sound disposal, (see also para. 33 above).

37. Many Parties reported to have taken or are taking measures to directly prohibit or effectively control the production and use of PCTs, and to ensure the destruction or disposal of PCTs in an environmentally sound manner, and to ensure that the transboundary movement of PCTs is conducted in an environmentally sound manner. In these countries, measures to destroy and/or dispose of PCTs are similar to measures to destroy and/or dispose of PCBs. However, similar control actions for PCTs either do not exist or are unknown for other UNECE countries.

F. Ugilec

Introduction

38. The Protocol on POPs requires Parties to reassess the production and use of ugilec by 31 December 2004. A dossier was prepared under the leadership of Mr. M. Herrmann (Germany).

39. In the European Union, ugilec is included in certain legislation together with PCTs under the definition of polychlorinated biphenyls (PCBs). However, Canada and the United States have chemically specific definitions, such that “PCB” includes only isomers of polychlorinated biphenyls (see also para. 28 above).

Production, use and control action

40. Ugilec 141 and ugilec 121 or 21 have in common a basic structure, which consists of a benzene ring connected to a toluene ring by means of a methyl bridge (benzyl-toluene). Each of the aromatic rings of ugilec 141 is replaced by two chlorine atoms. For ugilec 121, each ring has just one chlorine atom. Both are mixtures of isomers (e.g. for ugilec 141 there are theoretically 69 isomers).

41. Due to resembling chemical structures, the physico-chemical properties are similar to those of PCBs, making ugilec a candidate for PCB substitution in various industrial processes in the past.

42. Ugilec 141 and ugilec 121 or 21 constitute a concern for the environment by virtue of their ecotoxicity, persistence and potential to bioaccumulate.

43. Ugilec 141 and ugilec 121 or 21 have historically been used in capacitors, transformers

and as hydraulic fluids in underground mining.

44. For the recent questionnaire drawn up to solicit information on production, use and national action taken for elimination of (inter alia) ugilec, 23 Parties to the Convention on Long-range Transboundary Air Pollution responded on ugilec. An analysis of the responses revealed that in Canada and the United States there are no records of any production or use of ugilec either historically or currently. In Europe ugilec 141 was produced in France and used in Germany, Monaco and Spain. Ugilec 121 or 21 was notified in France as a new substance in 1984. It could not be elucidated, though, what volumes were produced before the manufacturer voluntarily withdrew its product from the market. EU legislation terminated marketing and use of both ugilec 141 and ugilec 121 or 21 in 1994. However, "use" did not include continued service of equipment already containing ugilec 141. Transitional arrangements for ugilec-containing equipment in service, e.g. retrofit, were established. These regulations were transferred to national chemical legislation of EU Member States. PCB-like wastes and equipment containing such material shall be disposed of as soon as possible, but not later than 2010.

45. All replies to the question of current production were negative. At the same time, a number of responses reflect considerable regulatory authority uncertainty on historical application patterns and totally consumed volumes of ugilec within their countries. The same comment applies for existing stockpiles: five respondents out of twenty-three expressed uncertainty about stockpiles of ugilec within their countries.

46. Ugilec production either ceased or never happened in many (responding) UNECE countries. Anecdotal, minor-scale uses cannot be totally excluded. Strategies for phasing out PCBs according to the requirements of annex II to the Protocol on POPs often also include ugilec 141 and ugilec 121 or 21.

47. Ugilec is not known to be currently used in the UNECE region. However, as with PCBs, it may be found in some countries in old electrical capacitors, transformers and other equipment, or as constituents or contaminants of some products.

Socio-economic factors

48. The phasing out of PCB caused an intensive search for safe alternatives. Although the have slightly less hazardous properties than PCB, it was quickly realized that ugilec 141 and ugilec 121 or ugilec 21 would not be safe surrogates for PCBs and PCTs. Consequently, ugilec failed to be widely established on the market as a PCB substitute. In several countries, e.g. Austria, Canada and the United States, it was obviously never produced nor used. Technical alternatives as well as chemical substitutes are available to replace any use of ugilec 141 or ugilec 121 or 21.

49. Further information on the production and use of ugilec 141 and ugilec 121 or ugilec 21 in non-UNECE countries, in particular countries with substantial mining activity, would be very useful.

Expert judgement

50. Production of ugilec 141 and ugilec 121 or 21 in any of the countries replying to a questionnaire has either been terminated or has never occurred. Definitive information on used quantities and use patterns in the past are generally very poor. For those UNECE countries where ugilec has been used, phasing-out programmes have been established.

51. Within the EU, ugilec 141 may be in use in some machinery until 2010. Although subject to a tight registration regime, the quantities still in use are widely unknown. This results from the lack of discrimination between PCB, PCT and ugilec, all of which are equally classified for the purposes of waste management.

Annex II

SUMMARY OF INFORMATION ON SUBSTANCES NOT INCLUDED IN THE PROTOCOL ON POPS

1. The Expert Group has been requested to assist Parties in preparing preliminary risk profiles for substances that may be candidates for inclusion in the Protocol and to prepare a compendium of information provided by national experts after technical evaluation of this material. In this context, dossiers on the following substances have been reviewed by the Expert Group: hexachlorobutadiene; pentabromodiphenyl ether; pentachlorobenzene; and polychlorinated naphthalenes. The full compendium with the information submitted by national experts that were lead authors for specific substances will be published as a separate document. This annex provides the summaries of the dossiers.

2. The dossiers and the following summaries were evaluated by the Expert Group on POPs at its third meeting on 5-6 June 2002 in Geneva. The Expert Group has assisted the Parties in preparing the dossiers by providing additional information or technical comments, but all conclusions in the dossiers and in the summaries below reflect the position of the Parties' experts that prepared the dossiers.

A. Hexachlorobutadiene

Introduction

3. The Expert Group reviewed a preliminary dossier provided by Mr. E. van de Plassche (Netherlands). Hexachlorobutadiene (HCBD) is a chlorinated olephinic substance.

Characteristics (in relation to the indicative criteria outlined in Executive Body decision 1998/2)

4. The dossier concludes that HCBD meets the criteria (see table below).

Criterion	Meets the criterion (Yes/No)	Remark
Potential long-range atmospheric transport	Yes	No experimental data available. Confirmed by – scarce – monitoring results.
Persistence in water, soil and sediment	Yes	Based on scarce and sometimes conflicting information.
Bioaccumulation	Yes	Based on one test with fish.
Toxicity and ecotoxicity	Yes	Nephrotoxic substance. Very toxic to aquatic organisms.

5. HCBD is very toxic to aquatic organisms with acute lethal concentration (LC) 50 and chronic no observed effect concentration (NOEC) values as low as 32 and 6.5 µg/l, respectively. It is nephrotoxic, with a long-term no observed adverse effect level (NOAEL) of 0.2 mg/kg of body weight (bw). It is also an International Agency for Research on Cancer (IARC) group 3 substance. A guidance value for drinking water of 0.6 µg was set by WHO. Several countries have set standards for HCBD.

Emission characteristics

6. The major historical use of HCBD was for the recovery of ‘snift’ (chlorine-containing gas in chlorine plants). HCBD is no longer used for this purpose. Present release to the environment of HCBD may originate from four pathways:

(a) Emission (unintentional release) from the production of the chlorinated solvents trichloroethylene, tetrachloroethylene and tetrachloromethane;

(b) Emission from the disposal of waste from the production of chlorinated hydrocarbons containing HCBD;

(c) Emission from the remaining commercial uses; and

(d) Emission from magnesium production.

7. The first pathway is the most relevant. Recent data are available only for Western Europe and the United States. The emission to air for 76 sites in Europe in 1997 was 2 kg, while in the United States in 1999 the emission to air was 2400 kg. The unintentional release to air of HCBD from the production of chlorinated solvents has decreased in Europe and the United States during the past decades (e.g. in Europe by more than 98% between 1985 and 1997).

8. The release to the environment of HCBD in other countries from the UNECE region and from outside the UNECE is unknown. As chlorinated solvents are produced in many parts of the world there is the potential of emission of HCBD to air and water. Considering the economic situation in these countries compared to Western Europe and the United States, the – unintentional – release of HCBD may be significant.

Environmental levels and bioavailability

9. Most monitoring data available for HCBD are from industrial areas where HCBD is detected in air, water and biota. Measurements in blubber of ringed seals in Canada indicate that HCBD is subject to long-range transport. Levels are low, averaging 0.07 ng/g. General data on

HCBD are scarce, especially with regard to persistence in water, sediment and soil.

Socio-economic factors

10. In May 2002, Canada published a final assessment report on HCBD. HCBD will be recommended for regulation in Canada as a toxic substance and as a target for virtual elimination of releases to the environment. It is also one of the priority substances of the EU Water Framework Directive. A recent environmental risk evaluation by Euro Chlor for the North Sea region indicates no unacceptable risk for aquatic organisms and birds and mammals exposed via the food chain (based upon observed levels).

11. None of the Parties responding to the 2001 questionnaire reported significant commercial use or production of HCBD. Ten Parties– two in Eastern Europe and seven in Western Europe, and the United States - reported production of chlorinated solvents in their country. Almost no information was available on the release of HCBD.

Conclusions

12. According to the dossier, HCBD can be regarded as a candidate POP, although not all data for the criteria are robust. The major release of HCBD to the environment is expected from the production of the chlorinated solvents trichloroethylene, tetrachloroethylene and tetrachloromethane, high-volume chemicals in all parts of the world. Although the emission of HCBD due to chlorinated solvent production was significantly reduced in Western Europe, Canada and the United States, this may not be the case in other parts of the UNECE region and outside the UNECE. The dossier concludes that HCBD may be a candidate for inclusion into the Protocol on POPs.

B. Pentabromodiphenyl ether

13. The expert group reviewed a preliminary dossier provided by Ms. Yla-Mononen (Finland) and Mr. N. Johanssen (Sweden) and prepared for the Nordic Council of Ministers. The dossier reviews the POP properties of pentabromodiphenyl ether (pentaBDE), a commercially available brominated flame retardant, in relation to the Protocol on POPs and provides additional background information.

Characteristics (in relation to the indicative criteria outlined in Executive Body decision 1998/2)

14. The dossier concludes that pentaBDE meets the criteria (see table below).

Criterion	Meets the criterion (Yes/No)	Remark
Potential for long-range atmospheric transport	Yes	Vapour pressure: 4.7-7.5 x 10-5 Pa at 25 °C Half-life in air: 10-20[a] days Found in Arctic air at remote sites (Alert and Dunai)
Persistence in water, soil and sediment	Yes	Half-life in water: 150[a] days Half-life in soil: 150[a] days Half-life in aerobic sediment: 600[a] d
Bioaccumulation	Yes	Log K_{ow}: > 5[b] (5.9-7.0) Bioconcentration factor (BCF): 27 400[b] (pike)
Toxicity	Yes	Sub-chronic: 0.8 mg/kg bw; behaviour effects in neonatal mice, single dose; chronic effects. Chronic: NOAEL often around 1 mg/kg/day. Enzyme induction: lowest observed effect level (LOEL): 0.44 mg/kg/day.
Ecotoxicity	Yes	Aquatic: EC_{50} 13 µg/L (crustacean) Terrestrial: NOAEL 1 mg/kg/day (many studies with experimental animals)

a/ BDE-47 and 99.
b/ Commercial mixture.

15. According to the data gathered, pentaBDE appears to fulfil the screening criteria set for adding new substances to the Protocol on POPs. There is clear monitoring evidence of contamination from remote regions and there are air analyses that demonstrate that the major components of pentaBDE can be transported long distances in the air because they have been observed in a significant portion in the vapour phase. In addition, modelling results indicate that the atmospheric half-life is between 10 and 20 days for the major components of pentaBDE, BDE-47 and BDE-99.

16. According to an available test result, pentaBDE is not readily biodegradable. Quantitative structure-activity relationship modelling data of the major congeners show that pentaBDE is persistent in water and sediment. This assumption is supported by sediment profile results and the results from marine mammal studies in remote areas.

17. The bioconcentration of commercial pentaBDE in carp was found to be very high and bioaccumulation in blue mussels has been reported to be even higher than the bioaccumulation of many PCB congeners. In addition, laboratory mammals and pike take up the major congeners efficiently and eliminate them slowly, indicating a high potential for bioaccumulation and resistance to biological transformation. Concentrations in aquatic biota have been shown to

increase as the trophic level increases, which means that pentaBDE biomagnifies in the food web. Recent studies on top predator bird species give further evidence of bioaccumulation and high persistency against biological transformation in the food web.

18. The ability of pentaBDE's to cause adverse effects has been shown in vivo experiments. The major effects shown in laboratory mammals are liver disturbances and developmental neurotoxicity. Endocrine disrupting and dioxin-like activity have been shown to occur in cells treated with pentaBDE components and their primary metabolites. In addition, adverse effects on growth and reproduction have been observed in aquatic organisms.

Environmental levels and bioavailability

19. Most of the recent studies show increased concentrations of pentaBDE in humans, fish and marine mammals. In some regions of North America, environmental concentrations of pentaBDE components are expected to soon reach the levels of PCBs in the environment. In addition, the use of pentaBDE also contributes to the releases of brominated dioxins and furans.

Emission characteristics

20. PentaBDE is used mainly in rigid and flexible polyurethane foams and polyurethane elastomers. Most of this polyurethane is used in turn in upholstery and furnishing. Global market demand for pentaBDE has more than doubled in the past decade to the present 8,500 metric tons per year. Simultaneously, the use in Europe has decreased to approximately 210 tons per year.

21. A major part of releases to the environment from articles containing pentaBDE occurs during or after their service life. The largest amount of the releases occurs in connection with weathering and wearing (dust), but volatilization has also been identified as a significant release route in all life-cycle phases. The releases are mainly diffuse by nature.

Socio-economic factors

22. Alternative chemicals and techniques are available for most uses of pentaBDE. In order to evaluate a formal proposal, an evaluation of the hazard and flame-retardant characteristics of pentaBDE and its alternatives would be useful.

23. The European Union is in the process of banning both the use of pentaBDE and also its use as an additive in products. Canada is conducting a regulatory review of all BDEs.

Conclusions

24. The dossier concludes that the most feasible way to restrict releases of pentaBDE would be

to restrict its use. Neither a single country nor any groups of countries alone can abate the pollution caused by the production, use and release of pentaBDE. Therefore, regional and global actions are needed to eliminate this pollution.

C. Pentachlorobenzene

25. The Expert Group reviewed a preliminary dossier provided by Mr. E. van de Plassche. Pentachlorobenzene (PeCB) is a member of the group of chlorobenzenes. Information on this substance is scarce. It is currently not used or is used only in minor amounts.

Characteristics (in relation to the indicative criteria outlined in Executive Body decision 1998/2)

26. The dossier concludes that PeCB meets the criteria (see table below).

Criterion	Meets the criterion (Yes/No)	Remark
Potential long-range atmospheric transport	Yes	Vapour pressure: 2.2 Pa at 25 °C Half-life in air: 277 days (measured in remote areas)
Persistence in water, soil and sediment	Yes	Half-life in water: 194–1380 days Half-life in sediment and soil: 103-345 days
Bioaccumulation	Yes	Log K_{ow}: 4.8 - 5.18 BCF values > 5,000
Toxicity	Yes	(Sub-)chronic: NOEC: 12.5 mg/kg bw Mutagenicity: negative
Ecotoxicity	Yes	Aquatic: LC_{50}: 250 µg/l (fish) and NOEC: 10 µg/l (crustaceans)

The information on the criteria is very scarce for PeCB and the information available, for instance studies on (eco)toxicology and (bio)degradation, is not very recent.

Emission characteristics

27. PeCB was used as a fungicide, as a flame retardant and in combination with polychlorinated biphenyls (PCBs) in dielectric fluids. However, since PeCB is (probably) not used and produced anymore in the UNECE region nor globally, it is unlikely that PeCB enters the environment as a result of these former uses.

28. Measurements show that there is still a considerable amount of PeCB in the environment. This can be ascribed to historical use, incineration processes and other similar secondary pathway emission routes. PeCB was a starting/intermediate material for the production of the pesticide

quintozene and was present as an impurity in quintozene. Quintozene is not addressed in the Protocol on POPs. However, in most UNECE countries quintozene is now produced using alternative techniques. Other potential secondary sources of PeCB include:

(i) Presence as an impurity in hexachlorobenzene (HCB) (although the use of HCB has virtually ceased);

(ii) From measurements it is clear that PeCB might be released during (municipal waste) incineration of organochlorine compounds and hydrocarbon polymers in the presence of chlorine. However no quantitative data are available;

(iii) PeCB has been identified in waste streams from pulp and paper mills, iron and steel mills, petroleum refineries and activated sludge waste water treatment; and

(iv) There may be release of PeCB from landfills due to historical use. However, no quantitative data are available.

Environmental levels and bioavailability

29. PeCB has been detected in remote areas at low levels in air, biota and seawater.

Socio-economic factors

30. PeCB is one of the priority substances of the recently adopted EU Water Framework Directive (2000/60/EC). The EU will propose community-wide water quality standards and emission controls for these priority substances. Within their list a group of so-called priority hazardous substances which are of particular concern for the freshwater, coastal and marine environment is identified. These substances will be subject to cessation or phasing-out of discharges, emissions and losses within an appropriate timetable that shall not exceed 20 years. PeCB is regarded as a priority hazardous substance.

31. Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR): PeCB appears on the OSPAR DYNAMEC list in Group V: Substances with PTB properties, but which are heavily regulated or withdrawn from the market (OSPAR 2000).

32. Quintozene: in the European Union quintozene is not included as an active substance in annex I to Directive 91/414/EEC (Official Journal of the European Communities, 27 December 2000). This means that EU member States shall ensure that authorizations for plant protection products containing quintozene are withdrawn within a period of six months from the date of adoption of the decision and no authorizations will be granted or renewed. Subsequently, the use

of quintozene will stop after June 2002 in the EU. Quintozene is used in Canada, the United States and some East European countries.

Conclusions

33. The dossier concludes that pentachlorobenzene meets the criterion of the Protocol on POPs. From the available information it is clear that PeCB is no longer produced and/or used. There is probably still emission from historical use (use of hexachlorobenzene, landfills and waste incineration) and maybe from the use of quintozene. Considerable amounts of PeCB are found in the environment and PeCB is also detected in remote areas, although in minor amounts. No information is available on the situation outside the UNECE region. It cannot be excluded that outside the UNECE region there is still some use of PeCB, or of products containing PeCB, like quintozene. The dossier concludes that PeCB may be a candidate for inclusion in the Protocol.

D. Polychlorinated naphthalenes

34. The Expert Group reviewed a preliminary dossier provided by Mr. E. van de Plassche. Polychlorinated naphthalenes (PCNs) are a group of substances based on the naphthalene ring system with one to eight chlorine atoms. PCNs - structurally similar to PCBs – were used for a wide range of applications up to 1980-1990 as technical formulations under such names as Halowax, Nibren Waxes and Seekay Wax. Over the past ten years, PCNs have gained more and more attention as they have been found to be widespread contaminants in the environment. Since PCNs are 'old' chemicals it is very difficult to obtain reliable quantitative estimates of production, use and releases to the environment.

Characteristics (in relation to the indicative criteria outlined in Executive Body decision 1998/2)

35. The dossier concludes that PCNs clearly meet the criteria (see table below).

Criterion	Meets the criterion (Yes/No)	Remark
Potential long-range atmospheric transport	Yes	Measured in remote areas in air.
Persistence in water, soil and sediment	Yes	Experimentally determined half-lives not available. Indirect evidence from monitoring data and sediment core studies.
Bioaccumulation	Yes	High BCFs for tri-, tetra- and pentaCNs.
Toxicity and ecotoxicity	Yes	Dioxin-like toxicity of several PCNs.

36. Recent toxicity studies have focused on the dioxin-like toxicity of PCNs. Relative potencies (REPs) of PCNs have been determined in several in vitro assays showing that REPs for the higher chlorinated naphthalenes are comparable to the REPs for PCBs.

Emission characteristics

37. The dossier also considers the characteristics of PCN emissions to the environment, which may occur (or have occurred) via the following routes:

(i) Production: there is no confirmed present production PCNs. The global production of PCNs has been estimated to be 150,000 tons;

(ii) Use: there is no (or minor) confirmed present commercial use of PCNs. Most important uses, in terms of volume, were in: cable insulation, wood preservation, engine oil additives, electroplating masking compounds, feedstock for dye production, dye carriers, capacitors and refracting index testing oils. More detailed - quantitative - data are not available;

(iii) As a component of technical PCB formulations. PCNs are formed in the production of PCBs. Recently several authors measured the PCN content in commercial PCBs up to approximately 1 mg/kg. A potential release of 100-169 tons of PCN can be estimated, being <0.1% of the total global production of PCNs of 150,000 tons;

(iv) Thermal and other processes. PCNs have been measured in fly ash from waste incinerators, iron sintering plants and cement kilns. The congener spectra are different from commercial mixtures such as Halowax, and contain mainly di- to heptachlorinated naphthalenes; and,

(v) Landfills, which are potentially a large source of PCNs due to the historical use pattern.

Laboratory data show that PCNs are released from old capacitors and wires from electronic equipment. However, almost no actual measurements are available.

38. It can be concluded that PCNs are and were released to the environment from various sources. It is almost impossible to quantify the present and past release to the environment in the UNECE region, as there are almost no historical quantitative data on production and use patterns. However, the use of PCNs must have been widespread within the UNECE region, considering their use in transformers. De novo synthesis of PCNs in thermal processes occurs. Probably, most of the measured concentrations in air originate from waste incineration. Landfills may be another

important source but data are lacking.

Environmental levels and bioavailability

39. PCNs have been measured in remote areas in air in the Arctic. Monitoring data are also available for soils, sediment, biota and human beings. These data clearly show that PCNs are transported over long distances: in air (mainly tri- and tetrachlorinated naphthalenes) and in water or biota (mainly tetra-, penta- and hexachlorinated naphthalenes).

40. ΣPCN/ΣPCB ratios have been determined in the United Kingdom in the air. A ratio of 0.2-0.25 is characteristic for 'background air'. This ΣPCN/ΣPCB ratio should reflect to a certain extent the respective use volumes. The ratio is somewhat higher than expected based on the estimation of global PCN production, being approximately 10% of PCB production.

41. Current atmospheric levels of PCNs cannot be fully accounted for from inventories of known emission sources.

Socio-economic factors

42. There are no known regulations nationally or internationally specific for PCNs. PCNs were not included in the questionnaire sent out by the UNECE secretariat, as it was expected that no quantitative data would be available within the UNECE region on aspects like production, use and emission estimates. This was confirmed by the meetings of the Expert Group on POPs. On the other hand – as stated above – there certainly are emissions and perhaps also some residual use in – and also outside – the UNECE region.

Conclusions

43. The dossier concludes that PCNs clearly meet the criteria for POPs. They are detected in remote areas and contribute a significant portion of the total dioxin-like activity in environmental samples. Much information has become available in the past decade – and this will probably continue to grow – on aspects such as dioxin-like toxicity, monitoring data for biota, air, sediment and soil in industrialized as well as remote areas.

44. Due to their toxicological profile and the fact that they are long-range transport chemicals, PCNs may be a candidate for the Protocol on POPs. In a next phase it should be evaluated if the measures already included in the Protocol for PCBs and emissions of POPs from stationary sources are sufficient to reduce PCN emissions or if additional measures for PCNs are needed.