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TRANSBOUNDARY AIR POLLUTION**

Working Group on Strategies and Review

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PERSISTENT ORGANIC POLLUTANTS

**DRAFT PROPOSAL FOR AMENDMENTS TO THE PROTOCOL ON
PERSISTENT ORGANIC POLLUTANTS**

Note by the secretariat

1. The present document has been prepared by the secretariat with the Chair of the Working Group on Strategies and Review in collaboration with the Co-Chairs of the Task Force on Persistent Organic Pollutants (POPs), at the request of the Executive Body¹.
2. The document lists draft proposals for revising the Protocol on POPs, with a view to providing a basis for negotiating possible amendments to the Protocol². The Working Group may

¹ ECE/EB.AIR/91, para. 36 (e).

² The document refers to the appropriate article and paragraph numbers of the Protocol and its annexes. New text that is proposed to be inserted into the Protocol is presented within square brackets.

wish to consider the proposed amendments and forward them to the Parties to the Protocol at the twenty-sixth session of the Executive Body.

3. The document is based on the outcomes of the review of the sufficiency and effectiveness of the Protocol obligations (EB.AIR/WG.5/2004/1 and EB.AIR/WG.5/2005/1) as well as on the exploration of the management options for the seven “new” substances accepted as POPs by the Parties to the Protocol³ (ECE/EB.AIR/WG.5/2007/14). Furthermore, it reflects the review of the best available techniques (BAT) and the proposed changes to the emission limit values (ELVs) by the Task Force on POPs (EB.AIR/WG.5/2004/1 and EB.AIR/WG.5/2005/1, paras. 27–37)⁴ and takes account of the options for amendment procedures of the annexes in article 14 of the Protocol, outlined by the ad hoc group of legal experts under the Working Group on Strategies and Review (ECE/EB.AIR/WG.5/2007/5).

I. PROPOSED AMENDMENTS TO ANNEX I

4. On the basis of the sufficiency and effectiveness review (EB.AIR/WG.5/2005/1, paras. 17–23 and EB.AIR/WG.5/2004/1, annex I, Parties may wish to consider the following proposals for amending annex I:

(a) Delete the conditions for the elimination of the production and use of DDT⁵, heptachlor, hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs) that are no longer relevant⁶;

³ Hexachlorobutadiene (HCBd), octabromodiphenyl ether (OctaBDE), pentachlorobenzene (PeCB), pentabromodiphenyl ether (PentaBDE), perfluorooctane sulfonates (PFOS), polychlorinated naphthalenes (PCN), and short-chained chlorinated paraffins (SCCP).

⁴ For more details, see: <http://www.unece.org/env/popsxg/3rdmeeting.htm> , individual chapters of sufficiency and effectiveness review 2 (e) BAT for major stationary sources: <http://www.unece.org/env/popsxg/2005/e%20BAT%20for%20major%20stationary%20sources%202.pdf>

⁵ Dichloro-diphenyl-trichloroethane.

⁶ The sufficiency and effectiveness concluded that there is no production or use of DDT in the UNECE region. However, according to the World Health Organization, the United Nations Food and Agriculture Organization and the United Nations Environment Programme, DDT is still needed for public health protection (against malaria) in certain regions outside UNECE. Therefore, effective, economically viable and less environmentally hazardous alternatives to DDT continue to be needed there.

(b) Delete the footnote related to “ugilec”, since polychlorinated terphenyl (PCT) and “ugilec”, which are included in existing fluids with PCBs, will be disposed of according to the destruction provision for PCBs of the Protocol.

5. On the basis of the proposed management options (ECE/EB.AIR/WG.5/2007/14, paras. 6–103), Parties may wish to consider the proposal to list substances in annex I as follows:

(a) PFOS, with exemptions for production for those critical uses identified in annex II⁷;

(b) C-PentaBDE⁸, to eliminate its production and use with an exemption for use in military airplanes; or alternatively, list TetraBDE and PentaBDE congeners individually to eliminate the production and use of commercial mixtures containing these congeners at concentrations greater than 0.1 per cent by weight⁹;

(c) C-OctaBDE¹⁰, to eliminate its production and use; or alternatively, list PentaBDE and HexaBDE congeners individually to eliminate the production and use of commercial mixtures containing the congeners at concentrations greater than 0.1 per cent by weight¹¹;

(d) PCN, to prevent production and use¹²;

(e) PeCB, to prevent production and use¹³;

⁷ Alternatively, PFOS could be included in annex II to the Protocol and the allowed uses specified together with their related conditions in the implementation requirements, see para. 6 (d) of the present document.

⁸ Commercial OctaBDE contains polybrominated diphenyl ethers with varying degrees of bromination, typically consisting of penta- to deca-bromodiphenyl ether isomers.

⁹ Another option would be a stepwise phase-out with limited derogations for specific uses and a reassessment of the allowed uses in the light of technical progress and additional knowledge. In addition, releases from waste from products and/or articles containing c-PentaBDE could be addressed through provisions on waste handling and waste treatment in annexes V and VIII. Special attention should be given to reducing emissions by adding recycling and shredder plants to annex VIII, with guidance on BAT/BEP (best environmental practices) in annex V (ECE/EB.AIR/WG.5/2007/14, paras. 28 and 29).

¹⁰ A commercial mixture containing polybrominated diphenyl ethers, typically consisting of penta- to deca-bromodiphenyl ether congeners (ECE/EB.AIR/WG.5/2007/14).

¹¹ Waste handling and treatment options for products and articles could be addressed in annexes V and VIII, with guidance on BAT/BEP in annex V.

¹² Another option would be to list PCNs both in annexes I and III.

¹³ Another option would be to list PeCB both in annexes I and III.

- (f) HCBD, to prevent production and use¹⁴;
- (g) SCCPs, to eliminate production and use; or alternatively, list SCCPs in annex II and specify allowed uses and related conditions in the implementation requirements¹⁵.

II. PROPOSED AMENDMENTS TO ANNEX II

6. On the basis of the sufficiency and effectiveness review (EB.AIR/WG.5/2005/1 paras.–23 and EB.AIR/WG.5/2004/1, annex I), Parties may wish to consider the following proposals relating to annex II:

- (a) Delete the specific uses exemptions for DDT¹⁶;
- (b) Delete the specific uses of technical HCH, and restrict the use of the lindane to the following uses only [1. seed treatment and 2. Public health and veterinary topical insecticide.] (Delete other uses of lindane);
- (c) Concerning the conditions for specific use of PCB¹⁷:
 - (i) After para (a), add a new paragraph (b) that reads: [“The elimination of the use of identifiable PCBs in equipment (i.e. transformers, capacitors or other receptacles containing residual liquid stocks) containing PCBs in volumes greater than 0.05 dm³ and having a concentration of 0.005 per cent PCBs or greater, as soon as possible, but no later than 31 December 2015, or 31 December 2020 for countries with economies in transition”];
 - (ii) Change current paragraph (b) into paragraph (c);

¹⁴ Another option would be to list HCBD both in annexes I and III. Unintentional releases could be addressed by adding source categories to annex VIII, with guidance on BAT/BEP in annex V.

¹⁵ These options could be related to specific conditions for a stepwise phase-out such as limited derogations for specific uses and a reassessment of the allowed uses in the light of technical progress and additional knowledge. In addition, waste handling and treatment options for products and articles containing SCCP could be addressed in annexes V and VIII with guidance on BAT/BEP in annex V.

¹⁶ Please see footnote 5 in para. 4 (a) of the present document.

¹⁷ In line with provisions in annex A, part II of the Stockholm Convention on POPs.

- (iii) Change current paragraph (c) into paragraph (d); and add reference to paragraph (b);
- (iv) Add new paragraphs (e) that reads: [“Ensure that equipment containing polychlorinated biphenyls, as described in subparagraphs (a) and (b), shall not be exported or imported except for the purpose of environmentally sound waste management];
- (v) Add new paragraph (f) that reads [“Endeavour to identify other articles containing more than 0.005 per cent polychlorinated biphenyls (e.g. cable-sheaths, cured caulk and painted objects) and manage them in accordance with paragraph 3 of Article 3”];
- (vi) Add new paragraph (g) that reads: [“Promote the following measures to reduce exposures and risk to control the use of polychlorinated biphenyls:
- (i) Use only in intact and non-leaking equipment and only in areas where the risk from environmental release can be minimized and quickly remedied;
 - (ii) Not use in equipment in areas associated with the production or processing of food or feed;
 - (iii) When used in populated areas, including schools and hospitals, all reasonable measures to protect from electrical failure which could result in a fire, and regular inspection of equipment for leaks”];
- (d) Specify the following uses for PFOS: [“1. For semiconductor manufacturing; 2. As photographic coatings; 3. For chromium plating; 4. As hydraulic fluids for aviation”];
- (e) Specify the following uses for c-PentaBDE: [“1. Specific uses in military aircrafts; 2. Use of imported articles”] and include the following condition: [“The restricted use of imported articles with C-PentaBDE shall be reassessed¹⁸”];
- (f) List PentaBDE in one of the following alternative ways: [list tetraBDE and pentaBDE congeners individually to eliminate the production and use of commercial mixtures containing these congeners at concentrations ≥ 0.1 per cent by weight] or [list C-PentaBDE in order to eliminate the production and use of C-PentaBDE.];

¹⁸ Annex II could specify a time frame or “a trigger” for the reassessment.

(g) Specify the following uses for SCCP: [“1. Dam sealants and conveyor belts for underground mining; 2. Non-emissive applications i.e. as a plasticizer in paints, coatings and sealants and as a flame retardant in rubber, textiles and plastics”];

(h) Add a footnote on PCTs and “ugilec” that reads: [“In absence of any known production or new use of polychlorinated terphenyls (PCTs) and ugilec in the UNECE region, these substances are included in the definition of PCBs”];

(i) Delete the footnote related to “ugilec”¹⁹.

III. PROPOSED AMENDMENTS TO ANNEX III

7. Parties may wish to consider the following proposals for amending annex III:

(a) Specify the reference year for PCBs, PCN, PeCB and HCBd as follows: [“2000; or an alternative year from 1995 to 2005 inclusive, specified by a Party upon ratification, acceptance, approval or accession”];

(b) Add a footnote referring to PCBs that reads: [“c/ Polychlorinated biphenyls emitted as unintentional by-product”].

IV. PROPOSED AMENDMENTS TO ANNEX IV

8. Parties may wish to consider the following proposals for amending annex IV, paragraph 7:

(a) Decrease the emission limit value for medical solid waste from 0.5 to 0.1 ng TE/m³;

(b) Decrease the emission limit value for hazardous solid waste from 0.2 to 0.1 ng TE/m³.

(c) Introduce new emission limit values for additional emission source categories as follows:

(i) [“Electric Arc Furnace: Existing facilities: 0.5 ng TE/m³; New facilities: 0.1 ng TE/m³”];

¹⁹ Idem as for annex I. See para. 4 (b) of the present document.

- (ii) [“Non-hazardous industrial waste (burning more than 1 ton per hour): 0.1 ng TE/m³”]

V. PROPOSED AMENDMENTS TO ANNEX V

9. Parties may wish to consider the following proposals for amending the annex V:

(a) Amend paragraph 10 (a) to read: “Replacement of feed materials which are POPs or where there is a direct link between the [composition of the raw] materials and POP emissions from the source”;

(b) Amend paragraph 12 as follows:

(i) Replace the words “cost-efficient” by [“cost-efficiency”] at the beginning of the paragraph;

(ii) After the two first sentences, add a new sentence that reads: [“Cost-efficiency considerations should take into account that the measures to reduce emissions of POPs also will reduce emissions of other pollutants, such as heavy metals or acidifying agents. The cost-efficiency of measures should be established in relation to the effects on all pollutants, and not be based on reduction of only the amount of POPs”].];

(c) In paragraph 13, after “hazardous waste”, add [“(non-hazardous) industrial waste”];

(d) Amend paragraph 15 as follows:

(i) Amend the first and the second sentences to read: “The primary measures regarding the incinerated wastes, involving the management of feed material by reducing halogenated substances and replacing them by non-halogenated alternatives, are not [always] appropriate for municipal or hazardous waste incineration. [In these cases it] is more effective to modify the incineration process...”;

(ii) At the end of the paragraph, insert a new sentence reading: [“In specific cases it can be efficient to separate halogenated substances from municipal waste or industrial wastes and to incinerate these halogenated wastes in dedicated waste

incinerators, equipped with the most effective emission abatement techniques to reduce emissions of PCDD/F”];

(e) In paragraph 16, after “...sufficient residence time --”, insert [“above”] 850°C.... and replace “ca.” by [”more than”] 2 sec --.... ;

(f) Amend subparagraphs 18 (a) and (b) to read “(a) Conventional dust [separators] for the reduction of particle-bound PCDD/F²⁰ [e.g. electrostatic precipitators (ESP) or fabric filters (baghouses)]; (b) [Oxidizing organohalogens through] selective catalytic reduction (SCR).”;

(g) In paragraph 19, first sentence, after “... reaching emission levels of insert [below] 0.1 ng TE/m³ ...”;

(h) Amend table I as follows:

(i) Under “management risks” relating to “elimination measures by modification of feed materials”, amend the first sentence to read: “Pre-sorting of feed material [is] not [sufficient]; only parts could be collected...”;

(ii) Under “management options”, “modification of process technology”, at the complement the last bullet point to read: “- Sufficient residence time and turbulence ; [more than 2 sec above 850°C, for Cl content in the feedstock above 1 % (m/m) above 1100°C ”];

(iii) Under “emission level (%)” for “electrostatic precipitation”, amend the text to read “medium [to high] efficiency”;

(iv) Regarding “Flue gas measures: High-performance adsorption unit with added activated charcoal particles (electrodynamic venturi)”, insert new text under “management risks” [“Residues of activated carbon (AC) or lignite coke (ALC) may be disposed of, catalysts can be reprocessed by manufacturers in most cases, AC and ALC can be combusted under strictly controlled conditions.”];

²⁰ Dioxins and furans.

- (v) Regarding “Flue gas measures: Different types of wet and dry adsorption methods with mixtures of activated charcoal, open-hearth coke, lime and limestone solutions in fixed bed, moving bed and fluidized bed reactors:”, insert new text under “management risks”: [“Residues of activated carbon (AC) or lignite coke (ALC) may be disposed of, catalysts can be reprocessed by manufacturers in most cases, AC and ALC can be combusted under strictly controlled conditions.”];
- (i) Amend paragraph 25 to read: “Metal production and treatment plants with PCDD/F emissions can meet a maximum emission concentration [below] 0.1 ng TE/m³ ...”;
- (j) Amend table II as follows:
- (i) Amend the title to read: [“Options for] emission reduction of PCDD/F in the metallurgical industry “;
- (ii) Regarding “Use of oxygen or of oxygen-enriched air in firing, oxygen injection in the shaft kiln (providing complete combustion and minimization of waste gas volume);”, amend the estimated costs to [“medium”] and add under “management risks”: [“High costs for PCDD/F reduction; moderate if advantages of oxygen firing are used“];
- (iii) Under “management options”, after “Fixed bed reactor or fluidized jet stream reactor by adsorption with activated charcoal or open-hearth coal dust”, add a second bullet point that reads: [“Single- and multi-stage fabric filter with injection of limestone / activated carbon upstream of the filter.”];
- (iv) Regarding “Fabric filter in combination with coke injection, amend the emission level column to read ” < 1 [(<0.1 ng TE/m³)];
- (v) Amend the first bullet under “management options: secondary measures” to read: “Single- and multi-stage fabric filter with added activation of limestone/ activated carbon [upstream] of the filter;”
- (k) At the end of paragraph 30 (e), add: [“injection of activated carbon in combination with a fabric filter”].];
- (l) At the end of paragraph 32 (b), insert a new sentence reading: [“A possibility to further reduce PCDD/F emissions is the injection of activated carbon upstream of the fabric filter.”];

(m) Amend paragraph 35 to read: "...fabric filters with the addition of limestone/activated carbon/open-hearth coal [upstream] of the filter meet the emission concentration...";

(n) Replace paragraph 40 by a new paragraph reading: ["Fuel switch from waste, coal, or biomass containing organohalogen compounds to natural gas will reduce the formation of organohalogen compounds in the off-gases. This can result in a significant decrease of PCDD/F emissions from small installations that are not equipped with emission abatement technologies".];

(o) At the end of paragraph 42, insert a new sentence reading: ["Emissions of PCDD/F from industrial power plants and boilers should not exceed emissions of PCDD/F from waste incinerators. The emission concentrations should be below 0,1 ng TE/m³."];

(p) Replace the first sentence of paragraph 43 with a new sentence reading: ["Residential combustion appliances can have a noticeable contribution to total emissions of PCDD/F".] and insert at the beginning of the second sentence the words: "[This contribution] is less significant when approved fuels are properly used";

(q) At the end of paragraph 48, insert two new sentences reading: ["Biomass fuels can have a high chlorine content e.g. straw, or wood from a saline environment, which can lead to an increased formation of PCDD/F when these biomass are incinerated as fuel. Fuel switch to fuels with a low chlorine content for dedicated combustion plants firing biomass will have a large impact on PCDD/F emissions. Installations firing biomass can be equipped with abatement techniques to reduce emissions of particulate matter, such as fabric filters or electrostatic precipitators; this will reduce emission of PCDD/F significantly."];

(r) In paragraph 70, insert two new subparagraphs (c) and (d) reading: ["(c) For existing and new stoves, by applying abatement techniques that control the emissions of particulate matter, like electrostatic precipitators, ceramic filters, fabric filters using metal filament fabric or retrofitting of after-burner; (d) For existing and new stoves, by applying abatement techniques that will burn the PAHs²¹, by re-circulating stack gases or by using catalytic converters that will oxidise the PAHs."];

²¹ Polycyclic aromatic hydrocarbons.

(s) At the end of paragraph 71, insert a new sentence reading : [“Emission of PAHs from domestic heating systems can be avoided by switching the fuels from wood or coal to natural gas, or can be reduced by switching to low sulphur oil.”];

(t) At the end of table VIII on PAHs emission control for residential combustion, insert a new line, reading: [“Secondary measures to reduce emissions of particulates or to burn PAHs; <5 % ; Medium to high; Costs are relative to size of the installation and re-use of heat produced”];

(u) At the end of annex V, insert three new chapters VI, VII and VIII, with new paragraphs 77 to 82 reading:

(i) **[“VI. CONTROL TECHNIQUES FOR THE REDUCTION OF HCB EMISSIONS**

A. Production of secondary aluminium

77. BAT is to replace hexachloroethane as a degassing agent by degassing agents not containing chlorine, e.g. argon or nitrogen.”

(ii) **VII. CONTROL TECHNIQUES FOR THE REDUCTION OF EMISSIONS OF BROMINATED OR CHLORINATED FLAME RETARDANTS OR PFOS**

78. Penta BDE, OctaBDE (or “commercial”) and short chained chlorinated paraffins (SCCPs) have been used as flame retardants in many products, such as electronic apparatus (e.g. business machines, personal computers), furniture and car interiors and other equipment. After service, these products are processed as waste or shredded before recycling, incineration or landfilling. To reduce emissions of brominated and chlorinated flame retardants, emissions have to be controlled and reduced.

A. Recycling or shredding municipal and industrial waste

79. BAT is to perform dismantling, crushing, shredding and sieving operations in areas fitted with extractive vent systems linked to abatement equipment when handling materials that can generate emission to air; BAT is to treat the exhaust air with a dust filter and/or a regenerative post-combustion for a residue-free combustion. An upstream pre-coat filter (activated carbon and lime mixture) to collect the adhesive components can also be used.

80. BAT is to perform washing processes considering the washed components that may be present in the items to be washed (e.g. solvents) and to treat the washings in the same way as the waste from which they were derived. The resulting wastewater can be treated in a wastewater treatment plant or re-used in the installation”.

(iii) **VIII. CONTROL TECHNIQUES FOR THE REDUCTION OF HEXCHLOROBUTADIENE EMISSIONS**

A. Non-ferrous metals production; Primary production of magnesium

81. Information on BAT for removal of hydrocarbons in primary production of magnesium is summarized in table X.

TABLE X

BAT for removal of hydrocarbons in production of magnesium

Pollutant	Emissions associated with the use of BAT	Techniques that can be used to reach these levels	Comments
Dioxins and hydrocarbons from the chlorination and electrolysis in the Mg production	Total destruction efficiency > 99.9%	Multi-stage scrubbers connected with a wet EP and an afterburner and injection of activated carbon	Dioxin emissions are < 10 µg/t TEQ for the MgCl ₂ brine dehydration process instead of 53 µg/t TEQ for the process which needs a chlorination step. The MgCl ₂ brine dehydration process is therefore regarded as BAT for new plants.
<p>Note: Collected emissions only. Associated emissions are given as daily averages based on continuous monitoring during the operating period. In cases where continuous monitoring is not practicable the value will be the average over the sampling period. For the abatement system used, the characteristics of the gas and dust will be taken into account in the design of the system and the correct operating temperature used.</p>			

B. Production of chlorinated hydrocarbons

82. BAT to reduce emissions of HCBd from production of chlorinated hydrocarbons is based on treatment of off-gas to reduce HCBd concentrations and on reduction of fugitive

emissions. Abatement techniques to reduce HCBD in off-gas can be based on adsorption, e.g. use of activated carbon, or absorption, e.g. use of wet scrubbers or cryogenic condensation by cooling the off-gas to very low temperatures.”].

VI. PROPOSED AMENDMENTS TO ANNEX VII

10. As a result of the phase out of leaded petrol in most parts of the UNECE region, petrol-fuelled vehicles are no longer a relevant source of PCDD/PCDF²². Furthermore, diesel-powered engines that are formally a main source of fine particulates with PAHs as a major component are subject to stricter controls for PM under regulations outside of the Protocol²³.

11. On the basis of the above, Parties may wish to consider the following proposals:

- (a) Delete annex VII;
- (b) Address PM (all aspects of it) under another Protocol to the Convention.

VII. PROPOSED AMENDMENTS TO ANNEX VIII

12. Parties may wish to consider the following proposals to amend annex VIII:

- (a) Amend the description of the category in the list of categories as follows:
 - (i) At the end of the description of category 1, insert [“or of non-hazardous industrial waste.”];
 - (ii) At the end of the description of category 3, insert: [“primary production of magnesium”];
 - (iii) At the end of the list, insert a new category 13 with a description reading: [“Large volume production of chlorinated hydrocarbons”];
 - (iv) Insert a new category 14 with a description reading: [“Installations for recycling or shredding of municipal and industrial waste”].

²² PCDDs – polychlorinated dibenzodioxins; PCDFs – polychlorinated [dibenzofurans](#).

²³ For more details see the paras. 33–37 of document EB.AIR/WG.5/2005/1.

VIII. PROPOSED AMENDMENTS TO ARTICLE 14 TO THE PROTOCOL

13. At its twenty-fourth session, the Executive Body requested the Working Group on Strategies and Review to consider, on the basis of the report of the ad hoc group of legal experts (ECE/EB.AIR/WG.5/2006/11), the possibility of an expedited procedure regarding amendments of the annexes to the Protocol. In addition, at its twenty-fifth session, the Executive Body took note of documents ECE/EB.AIR/WG.5/2007/5 and ECE/EB.AIR/WG.5/2007/5/Corr.1 outlining how an expedited amendment procedure with an opt-out clause could be introduced into the Protocol.

14. Parties may wish to consider the following proposals to amend article 14, with a view to introducing an expedited amendment procedure with an opt-out clause into the current Protocol on POPs:

(a) In article 14, between paragraphs 5 and 6, insert a new paragraph 5 bis., reading:

[5bis. The proposal, adoption and entry into force of amendments to annexes I–IV, VI and VIII shall be subject to the same procedures as for the proposal, adoption and entry into force of amendments to annex V and VII, set out in paragraphs 4 and 5, except that:

(a) The time frame of ninety days referred to in paragraphs 4 and 5 shall be one year;

(b) An amendment to these annexes shall not enter into force with respect to any Party that has made a declaration with respect to an amendment to those annexes in accordance with paragraph (x) of Article 16, in which case any such amendment shall enter into force for such Party on the ninetieth day after the date of deposit with the depositary of its instrument of ratification, acceptance, approval or accession with respect to such amendment.”].
