

## Annex F Questionnaire (one per chemical)

<b>Chemical name</b> (as used by the POPs Review Committee (POPRC))	<b>Commercial pentabromodiphenyl ether</b>
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**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	
<b>Name of the submitting Party/observer</b>	<b>Switzerland</b>
<b>Contact details (name, telephone, e-mail) of the submitting Party/observer</b>	<b>Federal Office for the Environment</b> <b>Substances, Soil and Biotechnology Division</b> <b>Contact: Bettina Hitzfeld / Georg Karlaganis</b> <a href="mailto:bettina.hitzfeld@bafu.admin.ch">bettina.hitzfeld@bafu.admin.ch</a> / <a href="mailto:georg.karlaganis@bafu.admin.ch">georg.karlaganis@bafu.admin.ch</a> <b>+41 31 32 31768</b>
<b>Date of submission</b>	<b>6 February 2007</b>

Additional Annex E information	
<b>(i) Production data, including quantity and location</b>	<b>No production</b>
<b>(ii) Uses</b>	<b>Uses are largely unknown. We expect polybrominated diphenyl ethers to be present in</b> <b>Office equipment (e.g. PC screens, copy machines, laptop accumulators)</b> <b>Furniture (e.g. foaming materials, textile coatings)</b> <b>Textiles</b> <b>Electrical equipment in the kitchen (e.g. kettle, blender)</b>

**Wall paints**  
**Building materials (e.g. isolation foams)**

1) Substance flow analysis of selected brominated flame retardants: PBDE and TBBPA  
 Published by the Swiss Agency for the Environment, Forests and Landscape (now: Federal Office for the Environment), Bern, 2002  
 2) L. Morf, J. Tremp, R. Gloor, Y. Huber, M. Stengele, M. Zennegg  
 "Brominated Flame Retardants in Waste Electrical and Electronic Equipment: Substance Flows in a Recycling Plant"  
 Environ. Sci. Technol. 2005, 39, 8691-8699  
**were already submitted in January 2005**

Values for commercial PentaBDE are difficult to obtain. We have therefore compiled monitoring data for polybrominated diphenyl ethers and specified the congeners when known.

***I. Compilation of total concentrations of persistent organic pollutants in fish from alpine lakes in the Grisons, Switzerland (ng/g, lipid weight (lw) based)***

<b>PBDE</b>	<b>Lake Tuma</b>	<b>Lake Lunghin</b>	<b>Lake Moesola</b>	<b>Lake Suretta</b>	<b>Lake Diavolezza</b>	<b>Lake Teo</b>	<b>Lake Grond</b>
BDE 99	14	37	6.0	5.3	3.5	9.4	7.0
BDE 100	8.5	12	4.2	5.9	1.6	5.0	3.8
BDE 153	3.2	10	0.30	2.1	0.61	2.6	1.5
BDE 154	0.52	1.2	<0.22	<0.089	<0.12	<0.11	<0.26
BDE 183	1.1	6.9	0.86	0.91	0.40	0.84	0.67
<b>Further information</b>							
<b>Fish species</b>	Brown trout, alpine char	Lake trout	Brown trout	Brown trout, alpine char	Lake trout	Brown trout	Brown trout
<b>Stocking</b>	Annual	Last in 1992	Annual	Unknown	Last 1977	Annual	Last 1978

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

Reference: Schmid, P. et al., Persistent organic pollutants, brominated flame retardants and synthetic musks in fish from remote alpine lakes in Switzerland, Chemosphere (2007), doi:10.1016/j.chemosphere.2006.05.080.

***II. PBDE in fish oil used as dietary supplement in Switzerland***

Fish oil capsules were bought from pharmacies. The origin of the fish ranged from the Pacific (New Zealand, Peru) to South Atlantic (plus unknown).

PBDE (BDE 28, 47, 99, 100, 153, 154, 183, and 209) was detected in all samples. Sums were between 0.069 and 3.8 ng/g; PBDE patterns were dominated by BDE 47, 99, and 100.

Reference: Zennegg, M. and Schmid, P. PCDD/F, PCB, Dioxin-like PCB, and PBDE in fish oil used as dietary supplement in Switzerland. Organohalogen Compounds (2006), 68: 1967-1970.

***III. ORGANIC POLLUTANTS IN SOURCE-SEPARATED COMPOST***

Compost and digestate was investigated for the presence of ΣBDE 28, 47, 99, 100, 153, 154, 183: median concentration 2.0 µg/kg dw (0.2-4.5 µg/kg

	<p>dw) and BDE 209: 7.3 µg/kg dw (0.6-30.8 µg/kg dw). Median concentrations of pentaBDE and octaBDE calculated according to Morf et al. 2005 were at 1.9 µg/kg dw, and 0.2 µg/kg dw, respectively.</p> <p><u>References:</u>  Morf, L. S., Tremp, J., Gloor, R., Huber, Y., Stengele, M., Zennegg, M. <i>Environ. Sci. Technol.</i> 2005;39:8691.  Brändli, R. et al. ORGANIC POLLUTANTS IN SOURCE- SEPARATED COMPOST, <i>Organohalogen Compounds</i> (2006), 68: 863-866</p>
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**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.

<b>A. Efficacy and efficiency of possible control measures in meeting risk reduction goals (provide summary information and relevant references):</b>	
<b>(i) Describe possible control measures</b>	
<b>(ii) Technical feasibility</b>	
<b>(iii) Costs, including environmental and health costs</b>	

**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>B. Alternatives (products and processes) (provide summary information and relevant references):</b>	
<b>(i) Describe alternatives</b>	

<b>(ii) Technical feasibility</b>	
<b>(iii) Costs, including environmental and health costs</b>	
<b>(iv) Efficacy</b>	
<b>(v) Risk</b>	
<b>(vi) Availability</b>	
<b>(vii) Accessibility</b>	

**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.

<b>C. Positive and/or negative impacts on society of implementing possible control measures (provide summary information and relevant references):</b>	
<b>(i) Health, including public, environmental and occupational health</b>	
<b>(ii) Agriculture, including aquaculture</b>	

and forestry \ (iii) Biota (biodiversity)																	
(iv) Economic aspects	<p><b>Substance flows of pentaBDE in Switzerland and implications of the prohibition for industry</b></p> <table border="1"> <thead> <tr> <th>Substance flows in Switzerland (t/a). Status late 1990s</th> <th>PentaBDE</th> </tr> </thead> <tbody> <tr> <td>Import with half products</td> <td>0</td> </tr> <tr> <td>Production of finished products</td> <td>0</td> </tr> <tr> <td>Import with finished products</td> <td>1.9</td> </tr> <tr> <td>Export with half products</td> <td>0</td> </tr> <tr> <td>Export with finished products</td> <td>0.4</td> </tr> <tr> <td>Consumption with consumer goods</td> <td>1.5</td> </tr> <tr> <td>Stock (t)</td> <td>500</td> </tr> </tbody> </table> <p>Substance flow analysis of selected brominated flame retardants: PBDE and TBBPA. Published by the Swiss Agency for the Environment, Forests and Landscape (now: Federal Office for the Environment), Bern, 2002</p> <p>The consumption of pentaBDE in Switzerland at the end of the 1990s, was estimated to be 1.5 t/a. No pentaBDE-containing half or finished products are produced or processed. Practically the total of the imported amount is found in cars (fire-protected upholstery). Before the 1990s, the uses were more manifold. About 90% of the pentaBDE stock of 500 t is located in long life building materials. The most important products with respect to stocks and emissions are polyurethane foams. The reduction in stocks and the low consumption in consumer goods shows that the placing on the market and use prohibitions of pentaBDE in the ORRChem will be of no consequence for Swiss industries.</p>	Substance flows in Switzerland (t/a). Status late 1990s	PentaBDE	Import with half products	0	Production of finished products	0	Import with finished products	1.9	Export with half products	0	Export with finished products	0.4	Consumption with consumer goods	1.5	Stock (t)	500
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(v) Movement towards sustainable development																	
(vi) Social costs																	

**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):**

(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):**

**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):**

The Cantons, which are responsible for implementation of the Chemical Laws in Switzerland, together with the Swiss Agency for the Environment, Forests and Landscape SAEFL (now Federal Office for the Environment FOEN), have in 1999 and in 2000-2002 conducted a market analysis of brominated flame retardants in plastics on the Swiss market. A total of 486 plastics components from 366 products were investigated from the following areas: office equipment, household and electrical appliances, vehicles, and electrical and building materials. Of the samples investigated, 0% contained PentaBDE.

Refence: E. Kuhn, T. Frey, R. Arnet, A. Känzig: Bromierte Flammschutzmittel in Kunststoffprodukten der Schweiz. Umwelt-Materialien Nr. 189, 2004. Publ.: Swiss Agency for the Environment, Forests and Landscape, now Federal Office for the Environment). German, English summary.  
<http://www.bafu.admin.ch/php/modules/shop/files/pdf/phpf9yZ3c.pdf>

The Cantons together with the Federal Office for the Environment (FOEN) will in 2008 conduct a further market analysis for octa-, penta- and decabromodiphenyl ethers.

Sample materials will be:

Office equipment (PC screens, copy machines, laptop accumulators)

Furniture (foaming materials, textile coatings)

Textiles

Electrical equipment in the kitchen (kettle, blender)

Wall paints

Building materials (isolation foams)

In addition to the above mentioned brominated flame retardants (BFRs), hexabromocyclododecan, tetrabromobisphenol A and other BFRs that may be used as

substitutes will be analyzed. A search for unknown brominated compounds will be conducted in order to identify unknowns.

The samples will be analysed in the cantonal laboratories as well as private laboratories

**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:**

**PentaBDE is severely restricted in Switzerland.**

See also: <http://www.bafu.admin.ch/chemikalien/01415/01422/index.html?lang=en> and <http://www.bafu.admin.ch/chemikalien/01410/01411/index.html?lang=en>

The following is an excerpt from the:

**Ordinance on Risk Reduction related to the Use of certain particularly dangerous Substances, Preparations and Articles**

(Ordinance on Risk Reduction related to Chemical Products (*ORRChem*)) of 18 May 2005

*particularly*

**Art. 3**

<sup>1</sup> The restrictions and prohibitions applicable to the use of specific substances, preparations and articles and the exemptions to these are regulated in the annexes.

<sup>2</sup> Exemptions under the annexes are granted only to persons who have their habitual residence or registered office in Switzerland

*and*

**Annex 1.9 (Art. 3)**

**Flame retardants**

**1 Organophosphorus compounds**

**1.1 Definition**

The following are organophosphorus compounds with a flame retardant effect:

- tris(2,3-dibromopropyl) phosphate (CAS no. 126-72-7);
- tris(aziridinyl)phosphine oxide (CAS no. 545-55-1).

**1.2 Prohibition**

It is prohibited for the manufacturer to place on the market textiles containing substances within the meaning of section 1.1 which are intended to be worn directly or indirectly next to the skin (clothing, wigs, fancy dress, etc.) or to furnish or carpet room interiors (bed linen, tablecloths, furniture fabrics, carpets, curtains, etc.).

**2 Brominated biphenyls and diphenylethers**

**2.1 Definitions**

<sup>1</sup> The following are brominated biphenyls and diphenylethers with a flame retardant effect:

- polybrominated biphenyls (PBBs) with the molecular formula  $C_{12}H_{10-n}Br_n$ , where  $2 \leq n \leq 10$ ;

b. pentabromodiphenylether (pentaBDE) with the molecular formula  $C_{12}H_5Br_5O$ ;

c. octabromodiphenylether (octaBDE) with the molecular formula  $C_{12}H_2Br_8O$ ;

d. decabromodiphenylether (decaBDE) with the molecular formula  $C_{12}Br_{10}O$ .

<sup>2</sup> Substances under paragraph 1 letters b to d also include congeners produced as by-products during the manufacturing process.

## 2.2 Prohibitions

### 2.2.1 Polybrominated biphenyls (PBBs)

<sup>1</sup> It is prohibited for new articles in the following categories to be placed on the market if their parts that are treated with flame retardants have a content of PBB exceeding 0.1% by mass:

- a. electrical or electronic equipment within the meaning of Art. 3 letter a of Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003<sup>30</sup> on the restriction of the use of certain hazardous substances in electrical and electronic equipment (Directive 2002/95/EC) covered by the categories mentioned in Annex IA of Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003<sup>31</sup> on waste electrical and electronic equipment (Directive 2002/96/EC);
- b. household luminaires;
- c. spare parts for articles under letters a and b;

<sup>2</sup> The prohibition within the meaning of paragraph 1 does not apply to electrical and electronic equipment covered by categories 8 (medical devices) and 9 (monitoring and control instruments) in Annex IA of Directive 2002/96/EC, or to replacement parts for such equipment.

### 2.2.2 Pentabromodiphenylether (pentaBDE) and octabromodiphenylether (octaBDE)

<sup>1</sup> It is prohibited to place on the market and to use pentaBDE and octaBDE or substances and preparations with a pentaBDE or octaBDE content equal to or greater than 0.1% by mass, except for analysis and research purposes.

<sup>2</sup> It is prohibited for new articles to be placed on the market if their parts that are treated with flame retardants have a content of pentaBDE or octaBDE exceeding 0.1% by mass.

### 2.2.3 Decabromodiphenylether (decaBDE)

<sup>1</sup> It is prohibited for new articles in the following categories to be placed on the market if their parts that are treated with flame retardants have a content of decaBDE exceeding 0.1% by mass.

- a. electrical or electronic equipment within the meaning of Art. 3 letter a of Directive 2002/95/EC covered by the categories mentioned in Annex IA of Directive 2002/96/EC;
- b. household luminaires;
- c. spare parts for articles under letters a and b.

<sup>2</sup> The prohibition within the meaning of paragraph 1 does not apply to:

- a. electrical and electronic equipment covered by categories 8 (medical devices) and 9 (monitoring and control instruments) in Annex IA of Directive 2002/96/EC, or to spare parts for such equipment;
- b. other items of equipment within the meaning of paragraph 1 letters a and b which contain decaBDE, and spare parts for these if, according to the state of the art, there is no substitute available.

<sup>3</sup> The FOEN issues the enforcement authorities with recommendations on the state of the art in relation to paragraph 2 letter b for. In this connection it relies especially on the results of the evaluation procedure under item 10 of the Annex to Directive 2002/95/EC.

## 3 Transitional provisions

<sup>1</sup> The prohibitions within the meaning of sections 2.2.1 to 2.2.3 do not apply to the following articles placed on the market for the first time before 1 July 2006:

- a. electrical and electronic equipment;

- b. household luminaires;
- c. spare parts for articles under letters a and b.

<sup>2</sup> The prohibitions within the meaning of section 2.2.1 paragraph 1 letter c and section 2.2.3 paragraph 1 letter c do not apply to spare parts for articles under paragraph 1 letters a and b.

<sup>3</sup> The prohibitions on the marketing and use of pentaBDE and octaBDE within the meaning of section 2.2.2 paragraph 1 do not apply to the manufacture of spare parts for articles under paragraph 1 letters a and b.

<sup>4</sup> Until 31 March 2006, the prohibitions on the marketing and use of pentaBDE within the meaning of section 2.2.2 paragraph 1 do not apply to the manufacture of aircraft emergency evacuation systems.

<sup>5</sup> The prohibition within the meaning of section 2.2.2 paragraph 2 does not apply to:

- a. spare parts for articles under paragraph 1 letters a and b;
- b. aircraft emergency evacuation systems which contain pentaBDE, until 31 March 2006.

<sup>30</sup> OJ L 37 of 13.2.2003, p.19. The texts of European Union legal documents mentioned in this Annex may be obtained against payment or consulted free of charge at the notification authority, Anmeldestelle für Chemikalien, 3003 Bern; they may also be accessed on the Internet at [www.cheminfo.ch](http://www.cheminfo.ch).

<sup>31</sup> OJ L 37 of 13.2.2003, p.24

**The Swiss prohibition of pentaBDE in the ORRChem is the application of the EU Directive 2003/11/EC.**

**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:**

[Note to the Secretariat]

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