

QUESTIONNAIRE

“Study to Support the Review of Waste-related issues in Annexes IV and V of Regulation (EC) 850/2004”¹

1) Aim of the questionnaire

The following questionnaire has been prepared by BiPRO GmbH (part of Ramboll)² in close coordination with the European Commission. The questionnaire aims at gathering up-to-date information and quantitative data on Persistent Organic Pollutants (POPs) and more specifically on waste related issues of certain “new POPs”, “candidate POPs” and “already listed POPs”. The information will provide the EU Commission with the necessary scientific basis to propose amendments to the POP Regulation (EC) 850/2004 (hereafter called “POP Regulation”), due to the listing of new substances and to the review of concentration limits for substances already listed. In addition, the study shall provide guidance on how wastes containing the new POPs may be managed.

2) Background information

POPs are a group of organic compounds that possess toxic properties, persist in the environment, bioaccumulate through the food web and pose a risk to human health and the environment. POPs are transported across international boundaries far from their sources through air, water and migratory species.

The "Protocol to the regional UNECE Convention on Long-Range Transboundary Air Pollution" (CLRTAP) and the Global "Stockholm Convention" on POPs are international, legally binding instruments aiming to reduce and eliminate the production, use and releases of POPs in the territories of all participating parties. Both contain provisions on the environmentally sound management of wastes consisting of, containing or contaminated by POPs (hereafter called “POP waste”).

Although substantial progress has been achieved in limiting the use and application of POPs and reduce their emission into the environment, there are ongoing releases into the environment as well as a constant cycling of substances released in the past. For an optimised approach to elimination, all sectors in the life cycle of a product and of anthropogenic emission sources need to be considered. In this framework, proper waste management can contribute substantially to the reduction of POP releases into the environment, and a comprehensive legislation on POP waste is a necessary pre-requisite.

The Stockholm Convention was implemented into EU Community law in 2004 by the POP Regulation. It foresees an obligation to generally destroy or irreversible transform the POP content

¹ Information related to this project on behalf of the European Commission is provided on a dedicated project website at <http://pops-and-waste.bipro.de>.

² BiPRO GmbH (part of Ramboll), Munich, Germany (www.bipro.de), has been contracted by the European Commission to carry out the “Study to support the review of waste-related issues in Annexes IV and V of Regulation (EC) 850/2004”

of waste above certain concentration limits (the 'low POP content'). In addition, in exceptional cases, waste above the limits may be otherwise managed with defined operations for specified waste types if destruction or irreversible transformation do not represent the environmentally preferable option and the concentration in such wastes are below another threshold (the 'high POP content').³

In 2017, the Conference of the Parties of the Stockholm Convention (SC) decided to add three new substances to the relevant Annexes. Every time a substance is listed as a POP by the SC, the parties have to reflect the listing in domestic legislation. The EU as a party to the Convention is requested to amend the POP Regulation by May 2018 to include these 'new POPs'.

In addition, three substances are currently under review procedures and are likely to be added to the list of POPs under the SC in the next years (the so-called "candidate POPs"). For the new POPs and the candidate POPs, there is a need to improve the knowledge basis regarding quantities that were used in the past, their concentrations and sources, as well as regarding aspects related to waste management in terms of disposal and recycling paths. This information is needed to assess possible disposal options and to establish concentration limits for waste⁴. Consequently, further analysis is needed for the following substances:

- **“new POPs”**: Decabromodiphenylether (decaBDE), short-chain chlorinated paraffins (SCCPs) and Hexachlorobutadiene (HCBD)
- **“candidate POPs”**: Dicofol, Pentadecafluorooctanoic acid (PFOA, perfluorooctanoic acid) and its salts and PFOA-related compounds, Perfluorohexanoic acid (PFHxS) and its salts and PFHxS-related compounds

Furthermore, new scientific information on three substances already listed in the annexes of the SC has raised the necessity of reviewing already established concentration limits. Therefore, the following substances require renewed analysis and, potentially adjustment of the concentration limits:

- **“already listed POPs”**: Hexabromocyclododecane (HBCD), Polychlorinated Biphenyls (PCB), Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF)

4) Instructions on using the questionnaire

Please note that some of the relevant questions might have already been addressed in requests for information under the SC or the Basel Convention (BC). Submissions from EU member states related to these requests for information will be reviewed and considered as appropriate for the purpose of the actual study.

The present questionnaire is provided as an MS-Word-file and it would be much appreciated to receive your responses using this electronic version. All questions are numbered and highlighted

³ Article 7 of Regulation EC (No) 850/2004

⁴ Note that for SCCPs and HCBD concentration limits are already established in the Annexes IV and V of the POP Regulation. Only for decaBDE new concentration limits need to be established.

in grey. All fields where input is desired are blue.

The questionnaire is structured in three main sections.

- **Section I – “new POPs”:** decaBDE, SCCPs and HCBD
- **Section II – “candidate POPs”:** dicofol, PFOA and PFHxS
- **Section III – “already listed POPs”:** HBCD, PCB and PCDD/PCDF

Please only fill in the sections that you consider relevant and where you can provide specific information. Please provide specific references wherever possible and do not hesitate to also send us additional background information in form of documents, reports, data sets or as links to websites.

We recommend to quickly screen all questions of a section before starting to fill in the information. If a question is unclear or if you desire to discuss a certain aspect, please do not hesitate to contact one of the following contact persons of the project team:

Contact person	E-mail address	Telephone
Mr Alexander Potrykus	apot@ramboll.com	+49 89 978970-100
Mr Milos Milunov	mo@ramboll.com	

All information provided will be used in a transparent and traceable way for the present study. Provided that your agreement is expressed below, submitted non-confidential information will be published on the dedicated project related website⁵. If you wish to submit information on a confidential basis, please indicate this in your response. Any confidential information will only be used in anonymous or aggregated form.

Please indicate in the following table whether you agree with the publication of your answers to the Questionnaires:

Section		Y/N
I.I	Occurrence of “new POPs” decaBDE, SCCPs and HCBD	Y
I.II	Recycling Operations/Waste Management Options for “new POPs”	Y
I.III	Concentration Limits for decaBDE, SCCPs and HCBD	Y
II.I	Occurrence of “candidate POPs” Dicofol, PFOA and PFHxS	
II.II	Recycling Operations/Waste Management Options for “candidate POPs”	
II.III.	Concentration Limits for dicofol, PFOA and PFHxS	

⁵ <http://pops-and-waste.bipro.de>

III Already listed POPs	
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Please return the completed questionnaire and any related documents to popwaste2018@ramboll.com before 29 March 2018.

In case you are rather interested to discuss with us by telephone, please let us know when we could reach you.

Name of Institution:	EuRIC – European Recycling Industries Confederation
Country:	Belgium
City/ CIP Code:	Brussels - 1030
Street:	Boulevard Reyers 80
Contact person:	Mélissa Zill
E-mail:	mzill@euric-aisbl.eu
Phone:	00032.2.706.87.24
Remark:	EuRIC represents mostly recyclers of plastics from WEEE and ELV. Our answers focus on decaBDE.

Section I – “new POPs”

Decabromodiphenylether (decaBDE); short-chain chlorinated paraffins (SCCPs); Hexachlorobutadiene (HCBD)

I. Occurrence of “new POPs” decaBDE, SCCPs and HCBD (articles in use, waste, recycled articles as well as (production) processes and unintentional releases)

1. a) Please indicate whether your country /company has *stockpiles of decaBDE, SCCPs or HCBD*.

b) If yes, please provide information on types, quantity, concentrations, etc.

a) Not relevant

b)

2. Please indicate any known *occurrence and concentration of the “new POPs” decaBDE, SCCPs and HCBD in different articles in use, waste categories and recycled articles.*

decaBDE	Specification of waste/article	Concentration [mg/kg]
Articles in use		
Wastes	E-waste, especially in appliances generating heat End-of-life vehicles, in particular textiles (seats)	
Recycled articles	Articles made with recycled plastics from ELV and WEEE	
SCCPs	Specification of waste/article	Concentration [mg/kg]
Articles in use		
Wastes		
Recycled articles		
HCBD	Specification of waste/article	Concentration [mg/kg]
Articles in use		
Wastes		
Recycled articles		

Remarks:

For decaBDE in particular, more detailed measurements of Bromine content in different types of e-waste can be found in the Table 5 of the study carried by INERIS in 2017 (p.18)
<https://www.actu-environnement.com/media/pdf/news-28718-ineris-tri-deee.pdf>

The concentration of decaBDE in WEEE plastics varies greatly depending on the types of appliances, the appliances having a potential to heat up during use usually containing higher concentrations.

3. Please provide information on quantities of waste containing “new POPs” that are currently generated, then disposed of or recycled

Remark:

It is difficult to give a reliable estimate of the quantities of waste containing decaBDE generated in the whole EU. As far as we know, the main types of waste which contains decaBDE are WEEE, ELV, and furniture. We could get country specific data on the amount of WEEE generated if needed (for example in France, the EPA ADEME issues a yearly report of the tonnage of WEEE generated, including the distribution in different categories). In general, for the waste streams for which a European Directive is in place (e.g. ELV, WEEE), Member States report to the European Commission the amounts of waste generated.

“new POPs”	Specification of waste	Waste generated (in kt)	Waste disposed of (in kt)	Waste recycled (in kt)
decaBDE				
SCCPs				
HCBD				

4. Please provide information on wastes containing “new POPs” that are currently recycled (now or in the near future) and on the extent of recycling. If possible, please specify the types of new articles produced from the recycled material.

“new POPs”	Types of waste recycled	Recycling rate [%]	New articles produced from recycled material
decaBDE	Plastics from WEEE		Wide variety of products, including plastics for electronic appliances, vehicles, and other consumer products.
	Plastics from ELV		
SCCPs			
HCBD			

Remarks:

Mixed plastics from WEEE are separated to produce mainly PP/PE, ABS and PS. The yield of this separation process is around 50% (separation of the parts containing Br above a certain concentration also occurs).

5. Please indicate up-to-date (reference) **measurement (analytical) methods** for identifying the presence and levels of the listed “new POPs” in waste.

For decaBDE: the separation is mostly made by assessing the Bromine content, as a simplified method to measure total Bromine the method used is usually XRF.

More precise analytical results, allowing to distinguish between the PBDE congeners, can be obtained by sending the samples to accredited laboratories performing GC-MS. This technique can be used occasionally, to characterise a waste stream for example, but not in the daily operations at industrial scale.

In France the EPR scheme for WEEE recently came up with simplified rules for identifying brominated compounds in plastics from electronic waste. These rules have been validated by the authorities and detail the various analytical methods and associated standards for identifying the compounds and their concentrations.

The EN 62321 sets the rules to determine (among others) the content of PBDE in electronic waste.

6. Please indicate known inexpensive **screening methods** for identifying wastes containing “new POPs”

Some portable detectors (XRF) allowing to detect bromine in plastics, piece by piece. However, this method cannot really be qualified as inexpensive, as some of these portable detectors can cost up to 10 000 €. This type of method is not adapted to industrial processes and do not allow to differentiate between the various compounds containing bromine (POPs and non-POPs).

7. Please indicate any known (**production**) processes using **decaBDE, SCCPs and HCBd** as well as options for the environmental management of their operation and potential related **unintentional releases of these POPs** into the environment.

Production processes using decaBDE: unknown to recyclers

II. Waste Management Options/Recycling Operations for “new POPs”

8. Waste separation for decaBDE, SCCPs and/or HCBd containing wastes:

a) How can be **distinguished** between **contaminated and non-contaminated waste**?

b) Which **separation operations** should preferably be used **in practice to separate** contaminated from non-contaminated waste (please provide further details if available)?

c) What should be the preferred **waste management options for the contaminated waste fraction** (please provide justification and further details if available e.g. related costs)?

- a) It is not possible to assume that a certain type of waste does not contain any POP, although it is known that some categories of WEEE are more likely to contain decaBDE than others.
No visual distinction can be made between waste containing POP and waste which does not contain any POP. The only way to distinguish contaminated and non-contaminated waste would be to screen each plastic piece by XRF, which is unrealistic and impractical in an industrial setting.

b)

Preferable separation operations	Relevant waste / new POP	Possible health risks for workers during separation of waste	Separation costs / ton of waste	Explanation / further information
Density separation	Mixed plastics / deca-BDE	None – the brominated compounds are embedded in the polymer and are not released during the separation operation which does not compromise the physical integrity of the plastics.		
XRT	Mixed plastics / deca-BDE	None – the brominated compounds are embedded in the polymer and are not released during the separation operation which does not compromise the physical integrity of the plastics.		
XRF	Mixed plastics / deca-BDE	None – the brominated compounds are embedded in the polymer and are not released during the separation operation which does not compromise the physical integrity of the plastics.		

Remarks:

When it comes to separation options, the preferred option is highly company dependent. Two main types of technologies are used, density separation or optical separation. Based on one or the other technology, each company develops its own process.

c)

Preferable waste management operations	Relevant waste / new POP	Possible health risks for workers during waste management (e.g. recycling)	Management costs / ton of waste	Explanation / further information
1. Cement kilns	decaBDE			
2. Co-incineration	decaBDE			Cement kilns are a type of co-incineration method.

Remarks:

In the Annex V of the POP Regulation (EC/850/2004), these activities relate to the operation listed under R1:

R1 Use principally as a fuel or other means to generate energy, excluding waste containing PCBs.

III. Concentration Limits for decaBDE, SCCPs and HCBd

9. Are you aware of any existing concentration limits for decaBDE in waste?

There is, to our best knowledge, no legally binding concentration for decaBDE specifically. Some limits exist in standards, such as the EN 50625, which imposes to carry out the separation of plastics containing above 2000ppm **elemental Bromine**. Some EU MS have made that rule mandatory in their domestic legislation.

10. Which concentration limits for decaBDE in waste according to the POP Regulation would you recommend? Please justify.

We would recommend a concentration limit of **1000 ppm** in waste to be included in the Annex IV of the POP Regulation. This limit of 1000 ppm should only apply to plastics having undergone a separation process, not on the initial mix of shredded plastics from WEEE and ELV before separation/treatment of plastics.

This limit would be in line with what is achievable technically and to be able to preserve the economic viability of the recycling sector.

11. At which lower concentration limits for decaBDE in waste would you expect relevant impacts (e.g. on recycling industry)? Please justify.

A value below 1000ppm would have very negative consequences for the recycling industry.

Recycling plastics from WEEE and ELV would not be economically viable anymore, as the majority of the plastics would have to be discarded with much higher adverse cross-media impacts in terms of soil pollution, resource efficiency or emissions to air. In addition, the current legally binding recycling targets (for WEEE Directive 2012/19/EU and ELV Directive 2000/53/EC) would no longer be reachable.

More importantly, at lower levels, the reliability of the laboratory analyses is no longer guaranteed. The detection limit of decaBDE is around 25 mg/kg, but the limit of quantification is much higher, around 300 mg/kg, and this is only for decaBDE, and the fact that other BDE compounds need to be measured has also to be taken into account.

12. Is there a continued need for the derogation provided for POP-PBDEs in articles produced from recycled materials in the POPs Regulation (i.e. level of 1,000 mg/kg or 0.1% by weight) of POP-PBDEs allowed in articles produced partially or fully from recycled materials?⁶ Please justify.

⁶ See Annex I Regulation (EC) No 850/2004

Yes, especially since this is also the level set in the REACH restriction currently in force for decaBDE in articles.

It is neither technically nor economically viable to envisage a lower limit than 1000mg/kg, given the state of the art of sorting techniques currently existing, and the concentrations of brominated compounds in plastics from electronic waste in particular.

It might be that this derogation might not be needed anymore once POP-PBDEs will have been phased out entirely, but as of today, and taking into account the existing exemptions granted under the Stockholm Convention for decaBDE (for automotive producers for example, running until 2030 – which means that decaBDE will be found in waste well after that date), such a derogation is fully justified.

In addition, EuRIC opposes the continuation of derogation for decaBDE under the Stockholm Convention since such exemptions delay the complete phase out of regulated substances and create in legislation itself legacy issues.

13. Is an adjustment of existing POP limit values for SCCPs⁷ and HCB⁸, as specified in Annex IV and V of the EU POP Regulation, and/or additional measures required (e.g. due to any notable developments)? Please justify.

14. Please indicate if, beyond the EU POP Regulation, there are any adjustments to EU legislation needed, resulting from the listing of the “new POPs” decaBDE, SCCPs and HCB under the Stockholm Convention.

There should be legal obligations related to eco-design. Recyclers have to deal with end-of-life product containing decaBDE, so manufacturers benefiting from exemptions under the Stockholm Convention who will continue to include decaBDE in articles should be obliged to:

1. Inform recyclers of the decaBDE content and location of the parts containing decaBDE in the products.
2. Bear the added cost of treatment at end-of-life linked to decaBDE.

15. Can you provide any other information or information sources relevant to Section I of this questionnaire on the “new POPs”?

⁷ Regulation (EC) 850/2004, Annex IV, concentration limit referred to in Article 7(4)(a): 10 000 mg/kg;
Maximum concentration limits of substance listed in Annex IV: 10 000 mg/kg

⁸ Regulation (EC) 850/2004, Annex IV, concentration limit referred to in Article 7(4)(a): 100 mg/kg;
Maximum concentration limits of substance listed in Annex IV: 1000 mg/kg

Section II – “candidate POPs”

Dicofol, Pentadecafluorooctanoic acid (PFOA, perfluorooctanoic acid), its salts and PFOA-related compounds, Perfluorohexanoic acid (PFHxS), its salts and PFHxS-related compounds

I. Occurrence of “candidate POPs” Dicofol, PFOA and PFHxS (articles in use, waste, recycled articles as well as production processes and unintentional releases)

**16. a) Please indicate whether your country /company has *stockpiles* of “candidate POPs” listed.
b) If **yes**, please provide information on types, quantity, concentrations, etc.**

- a)
- b)

17. Please indicate any known *occurrence and concentration of the “candidate POPs”*, in different **articles in use, waste categories and recycled articles.**

a) Dicofol	Specification of waste/article	Concentration [mg/kg]
Articles in use		
Wastes		
Recycled articles		
b) PFOA, its salts and PFOA-related compounds	Specification of waste/article	Concentration [mg/kg]
Articles in use		
Wastes		
Recycled articles		
c) PFHxS, its salts and PFHxS-related compounds	Specification of waste/article	Concentration [mg/kg]
Articles in use		
Wastes		
Recycled articles		

Remarks:

18. Please provide information on quantities of waste containing “candidate POPs” that are currently generated, then disposed of or recycled

“candidate POPs”	Specification of waste	Waste generated (in kt)	Waste disposed of (in kt)	Waste recycled (in kt)
Dicofol				
PFOA, its salts and PFOA-related compounds				
PFHxS, its salts and PFHxS-related compounds				

19. Please provide information on wastes containing “candidate POPs” that are currently recycled (or possibly in the future) and the extent of recycling. If possible, please specify the types of new articles produced from the recycled material?

“candidate POPs”	Types of waste recycled currently (or in the future)	Recycling rate [%]	New articles produced from recycled material
Dicofol			
PFOA, its salts and PFOA-related compounds			
PFHxS, its salts and PFHxS-related compounds			

Remarks:

20. Please indicate up-to-date (reference) measurement (analytical) methods for identifying the presence and levels of the listed “candidate POPs” in waste.

21. Please indicate known inexpensive screening methods for identifying waste to be classified as POPs wastes due to their content of the listed “candidate POPs”.

22. Please indicate any known (production) processes using dicofol, PFOA and PFHxS as well as options for the environmental management of their operation and potential related unintentional releases of these POPs into the environment.

II. Waste Management Options/Recycling Operations/for “candidate POPs”

23. Waste separation for dicofol, PFOA and PFHxS containing waste:
 a) How can be **distinguished** between **contaminated and non-contaminated waste**?
 b) Which **separation operations** should preferably be used **in practice to separate** contaminated from non-contaminated waste (please provide further details if available)?
 c) What should be the preferred **waste management option for the contaminated waste fraction** (please provide justification and further details if available e.g. related costs)?

a)

b)	Preferable separation operation	Relevant waste/candidate POP	Possible health risks for workers during separation of waste	Separation costs /ton of waste	Explanation / further information
1.					
2.					
3.					

Remarks:

c)	Preferable waste management operation	Relevant waste/candidate POP	Possible health risks for workers during waste management (e.g. recycling)	Management costs / ton of waste	Explanation / further information
1.					

2.				
3.				

Remarks:

III. Concentration Limits for dicofol, PFOA and PFHxS

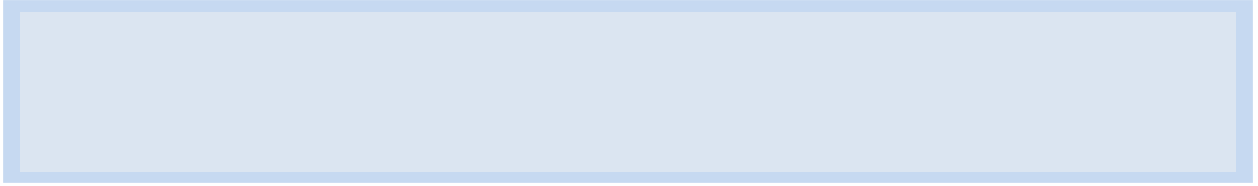
24. Are you aware of *any existing concentration limits for dicofol, PFOA and PFHxS in waste*? (please list limits individually)

25. Which *concentration limits for dicofol, PFOA and PFHxS in waste* according to the POP Regulation would you recommend? Please justify.

26. At which lower concentration limits *for dicofol, PFOA and PFHxS in waste* would you **expect relevant impacts (e.g. on recycling industry)? Please justify.**

27. Please indicate if, beyond the EU POP Regulation, there are any adjustments to EU legislation needed, resulting from the listing of the candidate POPs under the Stockholm Convention.

28. Can you provide any other information or information sources relevant to Section II of this questionnaire on the “candidate POPs”?



Section III – “already listed POPs”

Hexabromocyclododecane (HBCD), Polychlorinated Biphenyls (PCB), Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF)

29. *Are the existing concentration limits in Annex IV and V of the EU POP Regulation for HBCD, PCB and PCDD/F appropriate to ensure a sufficient level of environmental and health protection or is it necessary to adjust **them** (e.g. due to any notable developments such as new scientific data and technical progress, etc.)? Please justify.*

30. *If the existing limit values need to be adjusted, which **concentration limits for HBCD, PCB and PCDD/F in waste** would you recommend and why?*

31. *What would be the **major impacts from a possible adjustment of existing limit values of Annex IV or V of the EU POP Regulation**? Please justify.*