5 July 2004

EBFRIP Comments on the European Commission Consultation on the possible amendment of the RoHS annex according to Articles 5(1)(a) and 5(1)(b) of Directive 2002/95/EC

The European Brominated Flame Retardant Industry Panel (EBFRIP) has the following contribution to the Commission consultation to possibly exempt "Deca-BDE"[1] from the RoHS Directive's requirements.

Preliminary comment:

The Commission has stated that the RoHS Directive's wording on Deca-BDE is incorrect in that it does not restrict the use of Deca-BDE and would need to be changed for it to do so. At the same time, the Commission has recognised that the RoHS Directive contains an obligation to reconsider Deca-BDE's status under the RoHS "as a matter of priority"[2] in order to take account of the EU risk assessment of Deca-BDE[3] which has recently been concluded by EU Competent Authorities[4]. EU Member States are therefore currently in a difficult position as regards the RoHS' Directive's implementation. We therefore acknowledge the Commission's inclusion of Deca-BDE in this stakeholder consultation and, based on the EU Risk Assessment's recent conclusion of no need for restrictions, we submit that in view of maintaining proportionality and avoiding discrimination, Deca-BDE's exemption under the RoHS Directive is fully justified and requires urgent resolution.

1: Do feasible substitutes currently exist in an industrial and/or commercial scale?

In EBFRIP views, feasible substitutes to Deca-BDE should be defined as matching all of the following criteria:

- be as effective or more effective in term of enabling high levels of fire safety to be achieved,
- be easy to formulate in all applications,
- be eligible for a positive closure on a EU risk assessment in the next 18 months.

As this point we do not know of any substitute product which would meet these criteria.

[1] First substance from Item 10 of the annex of EU RoHS Directive 2002/95/EC
[2] Item 10 of the annex of EU RoHS Directive 2002/95/EC.
[3] Two letters from the European Commission DG Environment and Ms Wallström Cabinet of 22nd April and 10th May 2004 indicate that 'Deca-BDE would be reviewed once the results of the risk assessment were known'.
[4] Competent Authorities meeting of 26-27 May 2004, under Regulation 793/93/EC of March 1993 on the evaluation and control of the risks of existing substances.

2: Do any restrictions apply to such substitutes?

No regulatory restrictions apply, to our knowledge, to any potential substitute but none of these other substitutes have undergone and passed a EU risk assessment. Similarly, no restrictions are called for as regards Deca-BDE following the extensive 10-year risk assessment program.

3: What are the costs and benefits and advantages and disadvantages of such substitutes?

3.1 There are potential health and environmental disadvantages to use alternatives

The toxicology and environmental effects of alternative flame retardants are relatively poorly understood as "*the possible alternative substances to BFRs are, generally, even less investigated*"[5]. For instance, the Danish EPA[6] listed possible alternatives to brominated flame retardants which indicate the lack of scientific knowledge of these alternatives in term of health, environment and physical properties (see annex 1).

Risk assessments of other flame retardants are still on-going or have not started yet. As for instance indicated in the recent UK Environment Agency report[7] and database[8] defining the prioritisation of 98 flame retardants to be addressed in priority for environmental risk assessment (see annex 2): '*The work has resulted in the identification of a number of substances that are not yet under investigation by regulatory authorities*'[9].

On the other hands, as indicated by Prof. Dr. Martin van den Berg, University of Utrecht *"I cannot show that the deca-mix causes as much as only a pimple, while the substance yearly avoids hundreds of deaths and thousands of mutilations by fire*"[10]. Indeed, no flame retardants have been more thoroughly tested than Deca-BDE.

[5] Orango miljö konsulter, Brominated Flame Retardants, A Global Status Report, 1999, press release.
[6] Danish Environment Ministry Working Report 2000, alternative to BFRs, screening for environmetal and health data
[7] UK Environment Agency, 'PRIORITISATION OF FLAME RETARDANTS FOR ENVIRONMENTAL RISK ASSESSMENT', 2003, Peter Fisk Associates, doc link under: http://www.environment-agency.gov.uk/business/444304/444362/368813/379069/575663/578080/?version=1&lang_e
[8] Database can be obtained on request by contacting the UK Environment Agency Chemicals Assessment Unit, fax: +44 1491 828 556, e-mail ukesrenv@environment-agency.gov.uk
[9] Extract from UK Environment Agency website at: http://www.environment-agency.gov.uk/business/444304/444362/368813/379069/575663/578080/?version=1&lang_e
[10] Prof. Dr. Martin van den Berg, University of Utrecht, extract from an article in the Dutch newspaper 'de Volkskrant', Science section of 30 August 2003

3.2 There are inherent property disadvantages to use alternatives

Different substances are used for different applications, in contrast to Deca-BDE which is used in a large number of applications.

Alternatives are not always available: In certain plastic resins like HIPS, ABS, and PBT, there are currently no cost-effective alternative flame retardants which can provide good flame retardancy and good mechanical properties. As indicated by the UK Environment Agency report *"it is generally not possible simply to substitute one flame retardant for another, because of the substance specific interplay between flame retardant, polymer and properties of the finished product."* [11]

Higher quantities of alternative flame retardants are often necessary for the same applications: In order to achieve the same level of fire protection compared to Deca-BDE, higher quantities of alternative flame retardants very often need to be used. There are practical limits how much flame retardant can be added to a material before it unduly affects the material's integrity and strength. Not only does this place a more important potential burden on the environment (in terms of an increased level of plastic additive manufactured and transported), but costs are also often enhanced.

3.3 There are potential consumer safety disadvantages to use alternatives

Other flame retardants may not in all cases provide the same level of fire safety: Deca-BDE is the most effective flame retardant available today to prevent fire in its applications. It helps meet the highest levels of fire safety in private and public places all over Europe. A recent UK Environment Agency report summarised the situation: " *An extensive range of product standards, including EU, national and local regulations, has arisen in response to market pressure and litigation. These have resulted in more stringent flammability standards. Such standards can currently be met only by using flame-retardant systems based on brominated substances."* [12]

3.4 On the other hand, Deca-BDE presents advantages in term of recycling and fire safety:

Deca combines fire safety & recyclability: Deca-BDE is necessary for certain plastics to meet the highest levels of fire safety. The long experience with Deca-BDE and its continued evolution and use, means that plastics containing Deca-BDE will be part of the waste flow, in particular that of WEEE.

Extract from the Swedish Testing Institute SP on the life cycle analysis of a TV indicate: *The mechanical tests clearly show that the HIPS used in this project, containing deca-BDE has improved ageing properties compared to the HIPS used in this project, without deca-BDE. In*

[11] UK Environment Agency, 'PRIORITISATION OF FLAME RETARDANTS FOR ENVIRONMENTAL RISK ASSESSMENT', 2003, Peter Fisk Associates, page 33
[12] UK Environment Agency, 'PRIORITISATION OF FLAME RETARDANTS FOR ENVIRONMENTAL RISK ASSESSMENT', 2003, Peter Fisk Associates, page 33

fact, the investigation indicates that unaged FR-HIPS has slightly better mechanical properties than unaged NFR-HIPS. (…)
Importantly, the fire retardant behaviour of the FR-HIPS is retained after ageing. Thus, the FR-HIPS is able to pass its the flame retardant properties onto a new generation of products.
One can conclude, that in this investigation the HIPS containing deca-BDE is well suited to recycling with retention of important physical properties. "[13] (annex 3).

Plastics containing Deca-BDE have superior recyclability: Certain plastics with Deca-BDE can be and are already recycled because of their comparative stability in the recycling process. Several studies including the study from GfA[14] concluded that plastics containing Deca-BDE was superior to other plastics in terms of recyclability and can be recycled five times (see annex 4).

- Plastics containing Deca-BDE demonstrate good energy recovery and are fully compatible with metal recycling[15] (see annex 5).

- Closing the bromine loop is technically possible: APME has concluded (see annex 10) that co-combustion of plastics from WEEE in a modern household waste incinerator is one potential option and is an environmentally sound method for recovering Halogens from HFR plastics. Tests have been carried out on a commercial scale successfully. The bromine industry has undertaken a feasibility study to determine the economic and technical viability of bromine recovery from plastics containing BFRs[16]. This closes the bromine loop, ensuring the sustainability of bromine production [17](see annexes 6 & 7).

3.5 Deca-BDE presents advantages in term of health safety:

Deca-BDE is the only flame retardant which has undergone a EU risk assessment proving its safety for human health in term of consumers, children, workers and exposure via the environment and combine exposure. No other FR has completed and passed a EU risk assessment process yet.

As regards in particular to Deca-BDE safety for workers, many studies under the frame of the EU risk assessment indicate no risk A recent review performed by the UK Institute of Occupational Health (IOM)[18] on the potential exposure to Deca-BDE in workers specified that

[13] "Fire-LCA Model: TV Case Study", Margaret Simonson (SP), Håkan Stripple (IVL), 2000. Extract of recycling section, page 83
[14] GfA report "Analysis of a Decabromodiphenyloxide blend, a HIPS plastic, the HIPS plastic containing the DecaBDPO and Sb_2O_3 and the repeatedly recycled HIPS/Sb_2O_3/DecaBDPO plastic for partially brominated Diphenylethers and 8 polybrominated Dibenzo(p)dioxin and Dibenzofuran congeners, 1999
[15] "E&HS aspects on metal recovery from electronic scrap, Profit from Safe and Clean Recycling of Electronics" Boliden Mineral AB
[16] "Recycling of bromine from plastics containing brominated flame retardants in state-of the-art combustion facilities", Tamara, Vehlow, B. Forschungszentrum Karlsruhe Institut für Technische Chemie Bereich Thermische Abfallbehandlung, APME, EBFRIP
[17] "Implementation of thermal processes for feedstock recycling of bromine with energy recovery from plastics waste of electrical and electronic equipment (WEEE) phase 2", ECN, October 2001
[18] UK Institute of Occupational Health (IOM) "Review of the potential human exposure to decaBDE and the associated risks to health", 17 November 2003

"*The presence of relatively elevated concentrations of decaBDE in the blood of workers involved in recycling electronics does not imply an associated risk to health*" and that "*The risk of adverse health effects arising from these exposures is negligible and can be further reduced in the workplace by the use of standard occupational hygiene measures*."(see annex 8).

Furthermore, a recent follow up study carried out on worker safety in a Swedish electronic recycling plant indicated that levels of Deca-BDE were decreasing following implementation of standard industrial hygiene measures[19] (see annex 9).

Finally, recycling of Deca-BDE complies with the strict dioxin/furan emission limit values: Plastics containing Deca-BDE meet the strict PBDD/F limit values of the German "Dioxin Ordinance" in the recyclate if recycling is carried out according to standard health and safety practices[20]. Flame retardant materials like Deca-BDE burn less, producing just a third of the toxic gases and a quarter of the heat of unprotected appliances. Concerns over dioxin and furan formation during incineration have been addressed by the advanced incinerator technology now available and required under EU legislation.

3.6 Deca-BDE presents advantages in term of environment protection:

Deca-BDE is the only flame retardant which has undergone a risk assessment proving its safety for the environment. No other FR has completed similar process yet.

The BFR industry, together with EU regulators and the electronic and electric industry, is implementing a major program aiming at monitoring and reducing emissions in the environment and the biota all over Europe. This is an ambitious program, which only exists for Deca-BDE (see annex 10).

3.7 Deca-BDE presents clear advantages in term of scientific knowledge:

The EU risk assessment process was designed to provide the regulator with a scientific process by which to assess individual chemical substances. Being science-based, it took 10 years to amass and analyse scientific data on Deca-BDE.

The risk assessment process is a highly important procedure which must not be preempted. This is a point of principle which would otherwise undermine the Risk assessment process and the upcoming REACH policy.

This risk assessment which was concluded on 26 May 2004 should serve as a basis for a decision on the use of Deca-BDE in electrical & electronic equipments.

[19] "PBDEs in blood from Swedish workers – a follow up study in an electronic recycling industry" June 2004, Stockholm University, Lund University, ERGO, STENA. Report submitted for the conference FR 04
[20] GfA report "Analysis of a Decabromodiphenyloxide blend, a HIPS plastic, the HIPS plastic containing the DecaBDPO and Sb_2O_3 and the repeatedly recycled HIPS/Sb_2O_3/DecaBDPO plastic for partially brominated

Annexes:

1. Extract from Danish EPA study on potential alternatives to brominated flame retardants.

2. UK Environment Agency final report defining the prioritisation of 98 flame retardants to be addressed in priority for environmental risk assessment.

3. "Fire-LCA Model: TV Case Study", Margaret Simonson (SP), Håkan Stripple (IVL), 2000. Extract of recycling section.

4. GfA report "Analysis of a Decabromodiphenyloxide blend, a HIPS plastic, the HIPS plastic containing the DecaBDPO and Sb_2O_3 and the repeatedly recycled HIPS/Sb_20_3/DecaBDPO plastic for partially brominated Diphenylethers and 8 polybrominated Dibenzo(p)dioxin and Dibenzofuran congeners, 1999.

5. "E&HS aspects on metal recovery from electronic scrap, Profit from Safe and Clean Recycling of Electronics" Boliden Mineral AB.

6. "Recycling of bromine from plastics containing brominated flame retardants in state-of the-art combustion facilities", Tamara, Vehlow, B. Forschungszentrum Karlsruhe Institut für Technische Chemie Bereich Thermische Abfallbehandlung, APME, EBFRIP.

7. "Implementation of thermal processes for feedstock recycling of bromine with energy recovery from plastics waste of electrical and electronic equipment (WEEE) phase 2", ECN, October 2001.

8. UK Institute of Occupational Health (IOM) "Review of the potential human exposure to decaBDE and the associated risks to health".

9. "PBDEs in blood from Swedish workers – a follow up study in an electronic recycling industry" June 2004, Stockholm University, Lund University, ERGO, STENA. Report submitted for the conference FR 04

10. BSEF and BPF Code of Good Practice aiming at reducing emissions from the plastic sector.