E B F R I P

EUROPEAN BROMINATED FLAME RETARDANT INDUSTRY PANEL

A SECTOR GROUP OF CEFIC

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COMMENTS ON THE EUROPEAN COMMISSION'S PROPOSALS

ON WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

EBFRIP urges the European Parliament and the Member States:

- To recognise the benefits of brominated flame retardants in saving lives and property, and their contribution to lowering the environmental impact of electrical and electronic equipment prone to accidental fires.

- To postpone any decision on the proposed substitution of PBDEs until the completion early in 2001 of the risk assessments of Octa- and Deca-BDE.

- To recognise that end-of-life EEE plastics containing brominated flame retardants can be and are already being managed soundly, and that mandatory separation of plastics containing brominated flame retardants (which includes 96% of circuit boards) would impose additional and unnecessary burdens onto the recycling industry.

I. Brominated flame retardants save lives and are needed to comply with strict fire safety requirements

Brominated flame retardants (BFRs) are needed in many applications to meet existing stringent fire safety tests such as UL 94 – V0. For many products, the substitution of BFRs would entail not only a decrease in the fire safety performance of EEE, but could also force manufacturers to modify, and possibly multiply, the types of plastics used in EEE, and/or turn to alternative chemicals whose impact on the environment may be less understood and which may often need to be used in higher quantities to achieve an acceptable level of flame retardancy.

Brominated flame retardants have saved thousands of lives. The Commission itself has gone on record that, in the last 10 years, a 20% reduction in fire deaths is a result of the use of flame retardants[1]. We are not aware of any case of a brominated flame retardant costing a life.

In 1991, the Commission tabled a proposal to phase-out all uses of the three PBDE flame retardants. This proposal was blocked by the European Parliament in view of the lack of harmonised EU fire safety standards for upholstered furniture and was formally withdrawn by the Commission in 1994 further to developments in scientific understanding. It should be noted that, since then, the Commission has not proposed any harmonised fire safety standards for upholstered furniture, and that there is increasing concern with regard to fires involving EEE (in particular TV sets) due in part to the fact that existing standards ignore

[1] "Flame retardants", DG Environment, European Commission, 21 April 2000 (Video)

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external fire sources. Once again, the Commission has evidently not analysed the fire safety impact of a proposal to phase-out the PBDE flame retardants.

Contrary to Commission statements, the proposal on the restriction of substances (RoHS) does not contain an effective mechanism for taking into account the social and health impact of the substitution of PBDEs since no exemptions are proposed for the phase-out of PBDEs. Manufacturers may thus feel compelled to move out of PBDEs before the proposed review in 2004. Furthermore, the Regulatory Committee in charge of reviewing possible exemptions would be composed of officials in charge of waste policy, rather than of officials with expertise in the area of chemicals management.

Further, in a recent report to the European Parliament, the Institute for Prospective technological Studies (IPTS), part of the European Commission's Joint Research Centre, itself recommended[2] that:

> *"Regarding the phase-out of substances, it is advisable that implementation deadlines are proposed only in cases when these are transparently supported by widely acceptable ecological and techno-economic evaluation of the effects the substitute materials will have."*

II. Any decision to restrict the use of the three commercial PBDE products should be based on the results of the on-going EU risk assessments and should be taken in the context of the EU's legislation on marketing and use of chemicals

The Commission's proposal to restrict the use of certain substances in EEE calls into question the fundamental role of the EU's risk assessment process under EU Regulation 793/93/EC, as well as its relationship to trade law. The Commission's proposal represents a radical shift towards policy based on isolated scientific studies instead of an agreed risk assessment process that includes potential end-of-life impacts. This is an invitation for a series of substance phase-outs which could lead to the introduction of alternative untested substances having unforeseen environmental consequences, and contentious international trade barriers.

Preliminary results of the EU risk assessments for two of the three commercial PBDE products – Octa-BDE and Deca-BDE – indicate *no* need for risk reduction measures. These assessments are due to be completed in the first half of 2001 once the results of final studies are available.

The one PBDE for which risk reduction measures are being proposed (Penta-BDE) will be subject before the end of 2000 to a Commission proposal for phase-out. In any case, the Penta-BDE product is not used in electrical and electronic equipment (it is used to flame retard polyurethane foam used as cushioning material in upholstery). The commercial Octa- and Deca-BDE products are the only PBDEs used in electrical and electronic equipment

[2] "Towards a European Solution for the Management of waste from Electric and Electronic Equipment", Final report EUR 19628 EN, Demosthenes Papameletiou, European Commission, JRC, IPTS, Sevilla, June 2000

III. The proposals do not take account of the environmental benefit of flame retardant use

It is disappointing that the Commission has chosen not to recognise ground-breaking work by the Swedish National Testing Institute (SP)[3] which demonstrates, from a life-cycle perspective, the reduced environmental impact of television sets containing flame retarded plastics due to the avoidance of accidental fires. A reduction in the number of accidental fires significantly reduces the total emissions of dioxins and polycyclic aromatic hydrocarbons that originate from such fires. Thus, flame retardance of plastics actually decreases the amount of halogenated dioxins and furan and polycyclic aromatic hydrocarbons introduced into the environment.

IV. Mandating separation of plastics containing BFRs and printed circuit boards is not a viable option

IV. 1. BFRs are not an obstacle to recycling:

In calling for all plastics containing brominated flame retardants to be separated from the waste stream, it could be inferred that these materials are problematic for recycling. In fact, a recent independent study by the Japanese research centre Techno Polymer concluded that ABS containing BFRs was superior to other plastics in terms of recyclability.[4]

Studies have also shown that High-Impact Polystyrene with Deca-BDE can be recycled five times in full compliance with the German legislation on dioxin/furan product content and emission limit values, the strictest such legislation in the world.[5]

Certain plastics/BFR combinations are actually already being specified by leading manufacturers of photocopiers in part because of their comparative stability in the recycling process. Some 30% of new copiers from leading Japanese brands contain recycled plastic with brominated flame retardants[6]. This is feasible for large appliances in a closed loop of ownership and would not be helped by the required separation of all plastics containing BFRs.

Finally, the Human Health portion of the draft EU Risk Assessment on Deca-BDE concludes that workers in mechanical recycling operations involving plastics containing Deca-BDE are not at risk as long as proper industrial hygiene practices are observed.

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[3] LCA study of flame retardants in TV enclosures, Margaret Simonson, Swedish Research and Testing Institute (SP). Presented to Flame Retardants 2000 Conference, February 2000.

[4] A practical study to compare recyclability between non-halogen PC/ABS (HIPS) alloy and FR-ABS flame retarded by brominated epoxy oligomer, Takateru Imai, Techno Polymer Co. Ltd.

The study found that while there were differences in recycling performance between the other eight types of flame-retarded plastics, not one of them compared in recycling performance to the ABS plastic flame-retarded with bromine. The study concluded: "Among the commercially available plastics suitable for business machines, only FR-ABS flame retarded by brominated epoxy oligomer shows flawless recyclability in terms of keeping the original performance after the thermal history and accelerated hydrolysis testing."
Moreover, it was found that only the recycled ABS with brominated flame retardant met the highest levels of fire safety represented by UL 5V. This is the fire safety test with which copier manufacturers comply.

[5] Studies led by Dr. S. Hamm GfA (Gesellschaft für Arbeitsplatz- und Umweltanalytik) mbH, September 1999.

[6] "Ideal Resin Reclaiming Process Learned from Office Automation (OA) Equipment", Nikkei Mechanical, no. 542, November 1999.

IV. 2. Separation of plastics containing brominated flame retardants would represent a tremendous practical challenge to recyclers:

Brominated flame retardants represent only 12% in volume of the plastics fraction of WEEE, i.e. 2.7% of total WEEE, and are often used in small plastic parts and cables. In view of the small size of these components it would be technically impossible to separate out plastics containing brominated flame retardants as is proposed by the Commission.

Infrared technology for identifying the different plastics and their different additives (including flame retardants) is in development, but the availability of such technology is hardly guaranteed, particularly for small parts. In short, mandatory specification of the separation of all plastics containing brominated flame retardants risks being costly and difficult, if not impossible, to implement.

Furthermore, the obligation to separate out BFR-containing plastics would extend to printed circuit boards since approximately 96% of these contain TBBPA. Separation of the plastic from circuit boards would not only be impractical, but would also generate more waste since the resins used in circuit boards are notoriously difficult to recycle mechanically. It would also be counterproductive since there already exist efficient means of recovering this type of waste, e.g. through metals smelters.

IV. 3. Separation of plastics containing brominated flame retardants would, for certain recovery and recycling processes, result in the imposition of additional and unnecessary costs:

Metals smelting is a major process for recycling WEEE metals which does not require the separation of materials prior to the recycling process. Several metal smelters in Belgium, Germany and Sweden are equipped to recycle the metals from WEEE, which is often made up of metal and plastics parts that are, for all practical purposes, very difficult to separate in view of their minute size. Tests in these smelters demonstrate full compliance with stringent regulatory limits for environmental and worker safety. Enforcing separation of all plastics containing brominated flame retardants would introduce unnecessary costs for these important recycling processes.

Feasibility studies have also been completed which indicate the economic viability of establishing a feedstock recycling operation which would be able to recycle the bromine from WEEE[7] and would not require the separation of the different plastics.

In conclusion, specifying the separation of different materials in an EU Directive will merely lead to the separation of materials for incineration and disposal. Separation of all plastics containing brominated flame retardants would create two waste streams for WEEE plastics, neither of which in themselves are technically or economically viable for recycling at this day. Other recovery methods, such as energy recovery and bromine recycling, represent cost-efficient and environmentally sound alternatives to mechanical recycling, and it should be left to the recycler to determine for what material he has a market and when.

[7] Implementation of thermal processes for feedstock recycling of bromine and antimony, with energy recovery, from plastics waste of electrical and electronic equipment (WEEE), Dr.ir. H. Boerrigter, Netherlands Energy Research foundation ECN, July 2000

V. The Commission's proposals are based on outdated and incomplete scientific evidence

The Commission attempts to justify its proposed ban of the PBDE and PBB flame retardants in various sections of its explanatory memorandum on the WEEE and Restriction of Substances proposals. EBFRIP has the following concerns with regard to the lack of scientific rigour evident in the explanatory memorandum:

Much of the argumentation is based on "scientific evidence" which is not referenced:
Many of the statements justifying phase-out of the three PBDE flame retardants are made without scientific reference.

Outdated scientific studies are referred to while recent studies are ignored:
Reference to studies on Deca-BDE dating from the 1970s are not relevant because the product's purity has been significantly improved since the conclusion by the bromine industry of the first ever OECD Voluntary Industry Commitment[8]. Studies carried out since then demonstrate the sound toxicological and environmental profiles of the current commercial Deca-BDE product.

Preliminary conclusions to the EU risk assessments are ignored:
The preliminary conclusion of the EU risk assessment on Deca-BDE is that no risk reduction measures are required, any risks being able to be managed by standard industry practices[9]. A final set of studies on Deca-BDE is scheduled for completion in 2001 whereupon the final conclusions will be drawn.

The EU risk assessments on the three commercial PBDEs have either been ignored by the Commission, or their conclusion on the need to introduce risk reduction measures for Penta-BDE (only) has led to confusion.

Studies relevant to only one PBDE flame retardant are somehow assumed to be relevant to all three PBDE – and even all - brominated flame retardants:
The vast majority of scientific studies quoted as supporting a phase-out of all three PBDEs and (sometimes) all brominated flame retardants actually refer to findings in the environment and food chain of components of only one brominated flame retardant, Penta-BDE, which is soon to be the subject of a proposal for phase-out under Directive 76/769.

As stated in a recent report from the Swedish environmental consultancy Orango AB[10], there is no logic to target a wide range of substances on the basis of the common inclusion of a bromine molecule. Bromine is a natural substance used for good and is contained in a wide variety of products ranging from photographic chemicals to medicines. As flame retardants, some of the brominated flame retardants even transform to react with and become a part of the plastic. It is therefore impossible to make any meaningful scientific statements (and hence policy decisions) on the whole category of brominated flame retardants.

Industry has already ceased production and use of the PBB flame retardants:
It is surprising that the Commission does not refer to the fact that production of the last remaining PBB flame retardant ceased in May 2000. Manufacture and use of other PBB flame retardants ceased in the 1970s.

[8] Voluntary Industry Commitment by the US and European Producers of Selected Brominated Flame Retardants covered under the OECD's Risk Reduction Programme, 30 June 1995
[9] Risk assessment of bis(Pentabromophenyl)ether (Decabromodiphenyl ether), Final Draft, August 1999
[10] P. Hedemalm et al., "Brominated Flame Retardants, A global status report", Orango AB, March 2000