

# Polybrominated diphenyl ethers (PBDEs)

## Highlights of the effectiveness evaluation 2017

### Background Information

Hexabromodiphenyl ether and heptabromodiphenyl ether (hexa- and heptaBDE), and tetrabromodiphenyl ether and pentabromodiphenyl ether (tetra- and pentaBDE), collectively referred to as PBDEs or BDEs, are listed in Annex A of the Stockholm Convention with specific exemptions for use for recycling of articles that contain or may contain these chemicals.

The following guidance documents and guidelines have been developed to support parties in meeting their obligations (<http://chm.pops.int/Implementation/IndustrialPOPs/BDEs/Guidance/tabid/5374/Default.aspx>):

- Guidance on flame retardant alternatives to pentabromodiphenyl ether;
- Revised draft guidance on best available techniques and best environmental practices for the recycling and waste disposal of articles containing polybrominated diphenyl ethers listed under the Stockholm Convention;
- Revised draft guidance for the inventory of polybrominated diphenyl ethers under the Stockholm Convention ;
- Basel Convention technical guidelines for the environmentally sound management of wastes consisting of, containing or contaminated with hexabromodiphenyl ether and heptabromodiphenyl ether, and tetrabromodiphenyl ether and pentabromodiphenyl ether.

### Measures to reduce and/or eliminate releases

Limited information is available on the progress Parties have made towards eliminating PBDEs. Several Parties report that currently there is a lack of information on environmentally sound disposal and recycling operations for BDEs. According to studies on the existence of BDEs in products and recycling processes, the materials containing BDEs are mainly in electrical and electronic equipment and cars.

This issue is of high relevance in both industrialized and developing regions. According to a report published by UNEP in 2011, several challenges are noted for African countries in connection with e-waste management and subsequent contamination with BDEs. Specific challenges in the region are related to the control of used electric and electro-

nic equipment imports, collection strategies and sound technological recycling solutions, as well as support through policy, economic instruments, and legislation

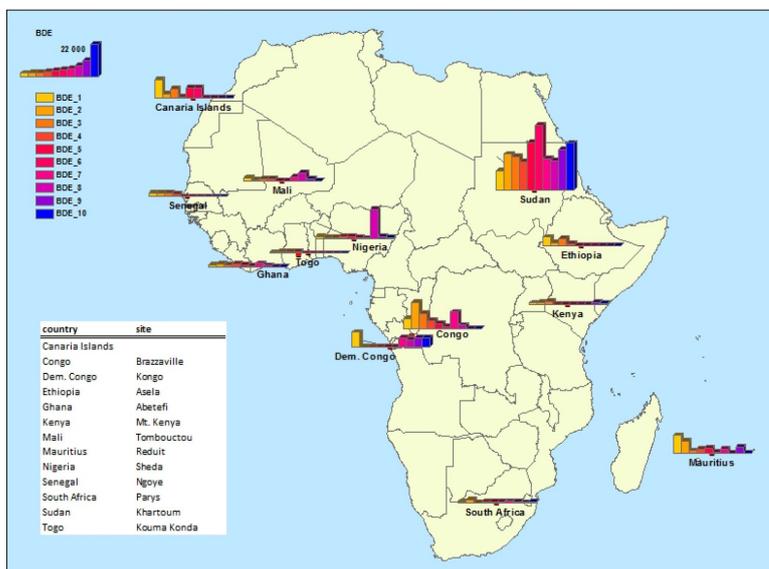
The main challenges identified at the seventh meeting of the Conference of the Parties in the elimination of BDEs include: information gaps related to the life cycle of BDEs (in particular for imported products); a paucity of studies to identify the presence of BDEs in products and recycling processes; understanding the activities taking place at waste management and recycling facilities and identifying best management practices; the task of separation of BDEs from the wastes fraction; and, the lack of effective techniques for the screening of BDEs in the waste stream .

### Changes in concentrations measured in the environment and in human populations

In most regions, only baseline monitoring data are available.

In Africa, for instance, PBDEs concentrations were generally low in air compared to other industrial POPs. The most abundant PBDEs were PBDE 47 (TetraBDE) and PBDE 99 (PentaBDE). Their probable origin is the crude recycling practices of e-wastes and end-of-life vehicles.

Levels of PBDEs in ambient air (PAS, pg sample-1) in Africa, 2010-2012 (UNEP/POPs/COP.8/INF/38)



In general, in the regions where long term monitoring data are available, air concentrations of PBDEs seem to show increases over the 1990s, then leveling off and decreasing in the early 2000s. While PBDEs generally showed declining trends in European sites, their trends are more variable at North American locations. It seems that concentrations are declining at urban sites, probably reflecting the replacement of these substances in cities; but declining trends were not observed in North American background sites in the Great Lakes and the Arctic. This observation may be related to the higher historical usage of these compounds in North America as compared to Europe, where declining trends in air are already being observed

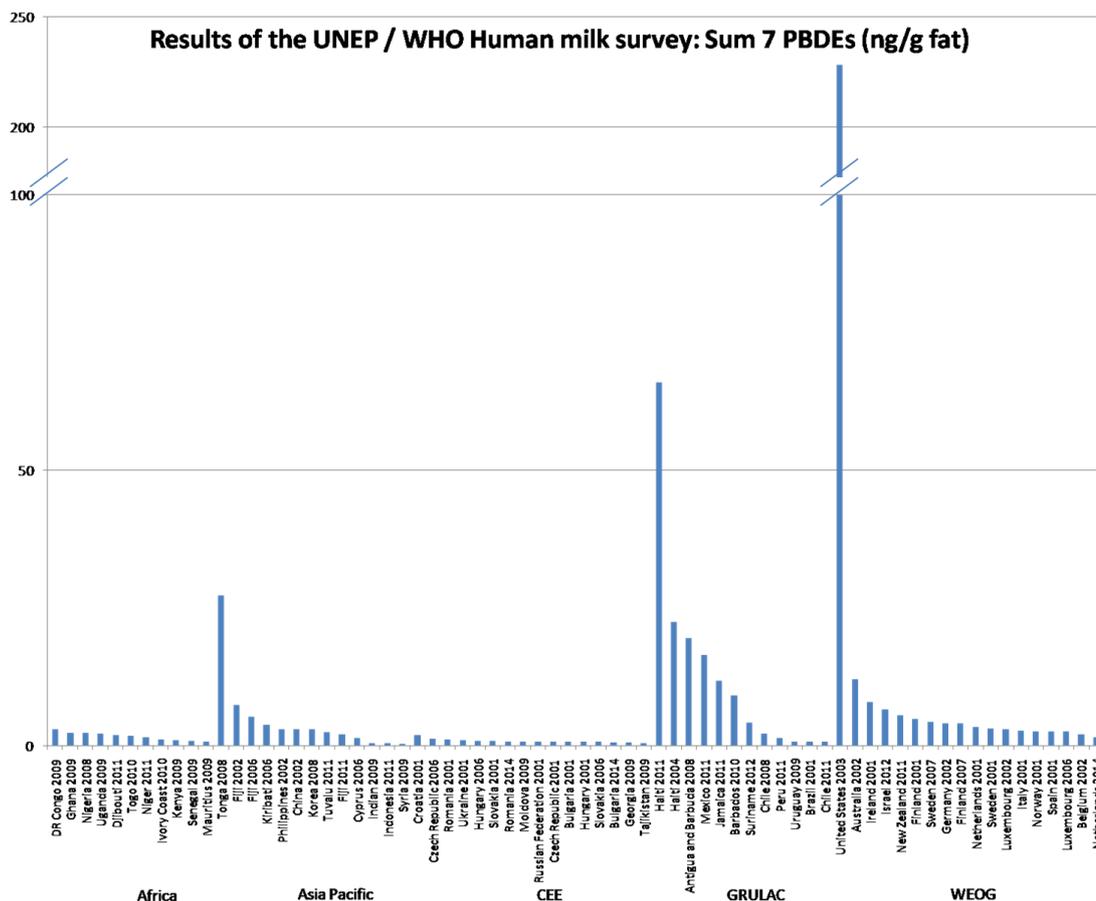
In human milk samples, high concentrations have been measured in pooled samples from industrialized countries such as USA and Australia, but also in the Pacific Islands (Fiji, Tonga) and in the GRULAC region (Antigua and Barbuda, Haiti, Jamaica, Mexico).

Elevated concentrations of PBDEs are reported in human blood in the Arctic, but these findings seem to be limited to Alaska (U.S. Arctic).

Concentrations from the European Arctic are the lowest. The concentrations reported from Alaska are comparable to, or even somewhat higher than, those recently reported for the general U.S. population.

In other media, PBDEs show increasing trends over the past decade, after which they seem to slow down or stabilize. Despite the significant decreases of

some POPs since the 1980s the ubiquitous presence of mixtures of relatively low levels of a numerous multiplicity of POPs gives reasons for concern.



## Conclusions and recommendations of the effectiveness evaluation committee

To date, limited information has been reported by Parties on progress made towards eliminating BDEs. The specific exemption for the recycling of BDEs listed in Annex A is available until 2030 at the latest, and the second evaluation of the progress that Parties have made towards eliminating BDEs and the review of the continued need for the specific exemptions will take place at the eighth meeting of the Conference of the Parties.

**Recommendation:** In order to evaluate the progress made in elimination of BDEs, Parties and observers should provide quantitative information on articles containing BDEs, including in recycling and waste streams.

**Recommendation:** The guidance documents made available at the seventh meeting of the Conference of the Parties should be completed in consultation with the Basel Convention so that they can be used widely to develop more comprehensive inventories of BDEs and help with the application of best available techniques and best environmental practices for the recycling and waste disposal of articles containing BDEs.