

Update on PCB inventories in Sub-Saharan Africa

By Professor Dr. Komla Sanda



Sectors covered by the preliminary PCB inventories

The National Implementation Plans (NIPs) developed for the Stockholm Convention indicate that in Sub-Saharan Africa, inventories of PCBs as part of the enabling activities under the Stockholm Convention focused exclusively on the electricity production, transportation and distribution sector. Thus, investigations have mainly focused on transformers, capacitors, disconnectors and circuit breakers.

Production and use of PCBs

The South African Republic is the only country among the 48 countries in Sub-Saharan Africa that produced electrical equipment potentially containing PCBs. All other countries in the region have imported such equipment from Europe, America, Asia and South Africa for various applications.

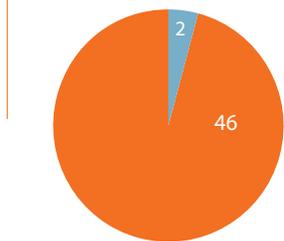
Holders of PCBs

The national electricity production, transportation and distribution companies are by far the largest holders of equipment that may contain PCBs. Other holders are big industrial facilities (mining sector, petroleum, food processing, cement, etc.), major hotels and some military installations. In Africa, PCBs are commonly used in the informal sector for non-food applications (welding equipment, hair or skin care products). They are also sometimes found as additives to cooking oils in the street food industry.

PCBs and PCB waste quantities

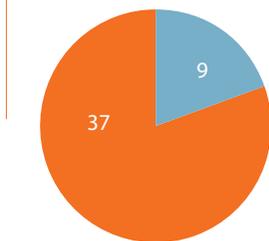
Of the 48 countries in Sub-Saharan Africa, 46 are Parties to the Stockholm Convention and 37 of these have developed and submitted their NIP to the Convention. However, only 11 countries out of 48 conducted testing of PCBs using the colorimetric method with the L2000 DX field analyser.

Status of ratification of the Convention in Sub-Saharan Africa



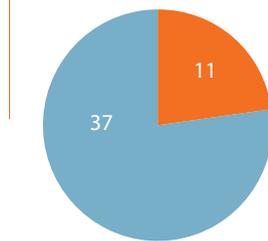
Party countries to the Convention
Countries not Party to the Convention

Status of NIP preparation in Sub-Saharan Africa



Countries having submitted a NIP
Countries not having submitted a NIP

PCB screening carried out in Sub-Saharan African countries



Countries having tested equipment for PCB
Countries not having tested equipment

For example, Benin has screened and labelled 190 pieces of equipment of the 2000 existing in the national electricity network. Equipment tested positive showed PCB concentrations in dielectrics of 50.1 to 4,973 ppm. If we extrapolate the percentage of equipment found to be contaminated to all equipment in the inventory, then 1,387 pieces of equipment are supposed to contain PCBs or be contaminated. This corresponds to 428,800 tonnes of liquid waste and 1,484,400 tonnes of solid waste.

As of March 31, 2004, when the last update of the inventory took place in Togo under the NIP, 675 pieces of equipment of the existing 1,000 pieces of electrical equipment were estimated to contain PCB or be contaminated. According to this data, the quantities of liquid and solid PCBs waste are 550 tonnes and 1,700 tonnes respectively. In addition, Togo has analysed and labelled 321 pieces of electrical equipment in the country (32% of the total number). The screening revealed that 193 electrical transformers are contaminated with PCB levels ranging from 50 to 11,649 ppm. Among the contaminated equipment, approximately 37% having levels greater than or equal to 500 ppm and are classified as «pure» PCB waste. The remaining equipment (63%), having PCB levels between 51 and 499 ppm are considered to be contaminated.

In Comoros, the screening of 114 pieces of electrical equipment from a total of 324 pieces revealed that 90% contain PCBs or are contaminated with PCBs. The quantities of liquid and solid PCB waste are estimated at 36 tons and 116 tons respectively.

Labelling of electrical equipment according to its PCB status:



Electrical transformer containing PCB (PCB level > 500 ppm)



Circuit breakers containing non-contaminated mineral oil



Electrical transformer classified contaminated (PCB level between 51 and 499 ppm)

In Southern Africa, Zambia has undertaken a comprehensive inventory of electrical equipment with a policy of environmentally sound management including the establishment of appropriate facilities for temporary storage and export of PCBs and their wastes disposal.

In addition, South Africa is the only country in Sub-Saharan Africa operating a high temperature waste incineration plant capable of treating PCBs and PCB wastes.

Finally, no quantitative analysis and identification of PCBs is mentioned in the different reports from the African countries. It can therefore be concluded that current inventories are not all accurate and do not give a clear picture of the magnitude of the problem of PCBs in sub-Saharan Africa.

Applicable regulations

Overall, the Sub-Saharan countries do not have legislation specific for PCBs. Their development and enforcement remain national priorities concerning POPs management.

Awareness on PCB issues

Policy makers, professionals in the electricity sector and the public know little of the physical and chemical properties of PCBs, their various applications and their adverse effects on human health and the environment. Highly contaminated equipment with leaking dielectric fluid is not in conformity with the recommendations of the Basel Convention (drip trays, control of pressure and temperature, labeling, inspections, etc.) for environmentally sound management of these liquids.

The existing technical infrastructure for the management of PCBs

As consequence to the low level of awareness on PCBs, specific legislation and national programs for environmentally sound management are lacking. Thus, with the exception of Zambia, very few countries mention the existence of temporary storages for PCBs and PCB wastes.

Risk to human health and the environment

Inventories have identified workers handling electrical equipment containing PCBs as the main risk group for exposure to PCBs. In general, it has been discovered that the technicians and support personnel in the electricity sector are unaware of the adverse effects of these substances on human health and the environment.

Other specific groups at risk exist in the informal sector: welders, scrap dealers and merchants dealing with end-of-life electronic transformers. In addition, the exposure risk of the general public is mentioned in some surveys that indicate that there is inappropriate use of PCBs for domestic food uses (additives for frying oils) and non-food uses (cosmetics and hair care).

Several inventories highlight risks of contamination of soil and water bodies by PCBs from leakage of dielectric oil from electrical transformers. However, the extent of contamination is unknown in most cases due to lack of chemical analysis. A few countries like Swaziland conducted the screening of PCBs in soil.

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Countries where
GEF projects on
PCBs are being
implemented

Examples of bad management of electronic equipment and the risks of exposure of humans and the environment



An example of poor storage practice

Countries' priorities related to PCB management

In the NIPs, it is usually established as a priority that there is need to address the completion of preliminary PCB inventories (inspection of all electrical equipment in the country, screening and appropriate labeling) to enable countries to have a comprehensive set of information. This is also true for the development and enforcement of specific rules related to PCBs and the development of secure locations – according to the standards of the Basel Convention - for temporary storage of PCBs and their wastes pending decontamination and final disposal.

Main PCB related projects in Africa

Country	Project	Source of funds	Implementing Agency	Implementation period	Cost including co-financing (million USD)
Ghana	Capacity Building for PCB Elimination	GEF	UNDP	2008-2013	8.503
Morocco	Safe Management and Disposal of PCBs, Pillar I and II	GEF	UNIDO and UNDP	2008-2011	15.008
Nigeria	PCB Management and Disposal Project	GEF	World Bank	2010-2014	18.5
Tunisia	Demonstrating and Promoting Best Techniques and Practices for Managing Healthcare Waste and PCBs	GEF	World Bank	2008-2012	22.840
Regional	Demonstration of a Regional Approach to Environmentally Sound Management of PCB Liquid Wastes and Transformers and Capacitors Containing PCBs	GEF	UNEP	2009-2013	15.226
Total					80.007

Some prospects for the region

The South African technical capacity to destroy POPs using high temperature incineration (ThermoPower Company) is unique in the region. It could be used by the countries of the sub-region for the elimination of their PCBs wastes. Moreover, Nigeria is considering setting up a facility using the Gas-phase Chemical Reduction (GPCR) technology.

Conclusion

The analysis of the various documents produced by the Sub-Saharan African countries shows that the available inventory on PCBs and equipment containing PCBs are incomplete and unreliable in light of the requirements of the Stockholm Convention. Indeed, the statistics on the number of electrical equipment contaminated with PCBs only provide estimated information based on the application of the basic assumptions that non-labelled equipment is supposed to contain pure PCB (PCB level > 500 ppm), equipment containing a producer label not mentioning the PCB content is supposed to be contaminated (PCB content between 50 and 499 ppm) and that equipment having a green PCB-free label is supposed to be PCB free. However, in African countries cross-contamination is very probable and equipment needs to be tested. The levels of contamination of equipment with PCBs are provided by only 11 out of 48 countries in the region.

Implementing environmentally sound management of PCBs in Sub-Saharan Africa in order to comply with the requirements of the Stockholm Convention set for 2025 (end of use of PCB equipment) and 2028 (environmentally sound management of PCB wastes) remains a major challenge for the Parties.

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