



## International Finance Corporation

### Environmental, Health and Safety Guidelines for

# Polychlorinated Biphenyls (PCBs)

The following guidelines serve to outline the major environmental issues associated with the installment, maintenance and disposal of PCB transformers and PCB contaminated equipment. World Bank guidelines allow for PCB transformers to remain in service, PCB-free transformers must be installed as old transformers are replaced. In general it is recommended that PCB equipment, particularly equipment located in commercial/residential buildings, should be replaced with PCB-free equipment as routine maintenance and replacement allows. Additional industry-specific environmental, health and safety guidelines may be applicable based on the location of the PCB related activities.

### Labelling

All equipment containing PCBs in a concentration exceeding 50 ppm should be clearly labelled as a precautionary measure to users of the equipment and as a reminder that such equipment must be treated as PCB-contaminated when taken out of service. This includes transformers that may contain PCB-contaminated mineral oils.

### Monitoring

Regular inspections of all transformers and PCB storage sites must be conducted to check for leakages and disturbance of equipment. Any equipment found to be leaking must immediately be taken out of service and handled according to the requirements outlined in this document. Regularly scheduled visual inspections are an integral part of monitoring and are recommended.

### Retrofilling

In certain applications, retrofilling may be preferred to replacement of a PCB transformer with a PCB-free transformer.

In the servicing or maintenance of transformers, the dielectric fluid may be removed from the unit and filtered to remove moisture or particulate matter and returned to the same unit. If any unit requires topping up after servicing or during regular maintenance, a non-PCB fluid must be used.

### Transport

Any PCB article containing more than 500g of PCB mixture must not be transported unless the PCB article has been securely contained and packaged to include:

- a) a leak proof inner packaging made of earthenware, plastic or metal.
- b) an outer packaging that is: (i) a drum made of steel, aluminum, plywood, fibre or plastic, or (ii) a box made of wood, plywood, reconstituted wood or fibreboard.
- c) sufficient absorbent material (capable of absorbing 110% of the internal volume of the packaged PCB article) placed between the inner and outer packaging to prevent any liquid from escaping from the outer packaging. "Absorbent Material" includes any material such as vermiculite, sawdust, coconut fibre, or any of various other natural fibres that are inherently absorbent.

## Storage

Wastes that contain 50 ppm or more PCBs require secure storage and monitoring until disposal. PCB transformers and dielectric fluid containers (packaged as described above) must be stored in a secure (see "Security" below) area sheltered from the elements until such a time when they can be disposed of in accordance with the methods outlined below.

Storage facilities must meet the following criteria:

- a) Adequate roof and walls to prevent rain water from reaching the stored articles.
- b) A concrete floor having continuous curbing so that the floor and curbing provide a containment volume equal to at least two times the internal volume of PCB article/container or 25% of the total volume of PCB containers stored therein.
- c) No drains, joint lines, sewer lines, or other openings that would allow fluids to flow from the curbed area.

## Disposal

High temperature incineration is the preferred method of destruction for PCB waste. A minimum temperature of 1,200°C and residence time over two seconds achieves 99.99% destruction.

Another option is chemical dechlorination. This is a process which breaks down PCBs by liberating chlorine atoms. Once broken down, chlorine is separated into its various salts enabling ready disposal of all fluids and substances.

In addition to storage, PCB articles (packaged in the specified manner) may be disposed of in landfills specifically designed to accommodate hazardous materials.

## Fire

The major hazard resulting from fires involving transformers and capacitors is the formation of PCDFs (polychlorinated dibenzofurans).

Key preventative measures include the following:

- a) Provision of information and training of personnel.
- b) Proper identification of equipment containing PCBs (see "Labelling" above).
- c) Installation and maintenance of protective systems (e.g., fire alarms, extinguishers, emergency electrical cut-off, and control of leaking PCB fluids, vapours or soot).
- d) Preparation of an emergency response plan.

Where possible, the complete removal of PCBs from equipment and replacement with non-PCB fluids is recommended.

## Security

All transformer sites, irrespective of their location, must be secured against unauthorised access (e.g., by fencing) to prevent against vandalism and accidental exposure to PCBs and high voltage.

## Occupational Health and Safety

When handling PCB fluids, or when the potential for close contact with PCBs exists (e.g., leakage inspections; spill cleanup; transfer from transformer to drums, etc.) proper clothing and gear must be worn to prevent contact with skin and eyes from spills, splashes and, also, to prevent inhalation of fumes which may be generated when

PCB fluids are heated above 55 °C. In any operation where there is risk of contact, plastic or rubber clothing should be worn, including gloves, boots or overshoes, overalls and a bib-type apron which covers the boot tops. Eye protection is also necessary. Chemical safety goggles, face shields or safety glasses with side shields are all satisfactory. For major spill cleanup activities, a full suit of non-porous material may be appropriate. Clothing that has become contaminated should be disposed of as a PCB waste rather than attempting to decontaminate and reuse it. Handling of hot PCB fluids should be avoided. A full face respirator is

required when fluid temperatures exceed 55 °C. Ventilation of the working area must also be sufficient to remove generated vapours.

### **Work in Confined Spaces**

- a) Prior to entry and occupancy, all confined spaces (e.g., tanks, sumps, vessels, sewers, excavations) must be tested for the presence of toxic, flammable and explosive gases or vapors, and for the lack of oxygen.
- b) Adequate ventilation must be provided before entry and during occupancy of these spaces.
- c) Personnel must use air-supplied respirators when working in confined spaces which may become contaminated or deficient in oxygen during the period of occupancy.
- d) Observers/assistants must be stationed outside of confined spaces to provide emergency assistance, if necessary, to personnel working inside these areas.

### **Record Keeping and Reporting**

- a) The sponsor should maintain records of significant environmental matters, including monitoring data, accidents and occupational illnesses, and spills, fires and other emergencies.
- b) This information should be reviewed and evaluated to improve the effectiveness of the environmental, health and safety program.
- c) An annual summary of the above information should be provided to IFC.