NATIONAL ACCELERATOR LABORATORY

ENVIRONMENT, SAFETY & HEALTH DIVISION

Chapter 32: Polychlorinated Biphenyls

Quick Start Summary

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1 Who needs to know about these requirements

The requirements of Polychlorinated Biphenyls apply to workers, supervisors, equipment owners, and Waste Management.

2 Why

Polychlorinated biphenyls (PCBs) are considered a hazardous material/waste and are known to cause chronic reproductive effects, gastric disorders, and skin lesions in laboratory animals, and the US Environmental Protection Agency (EPA) has identified PCBs as probable human carcinogens.

3 What do I need to know

PCBs are most commonly found in electrical equipment such as transformers, klystrons, capacitors, and fluorescent light ballasts manufactured before 1979. PCBs are a diminishing hazard at SLAC because PCB-containing equipment is maintained in a manner that reduces PCB contamination, and in many cases such equipment has been replaced.

Equipment and *items* potentially containing or contaminated with PCBs must be labelled, inspected, decommissioned, and disposed of in accordance with the requirements described in this chapter. Workers must use proper personal protective equipment (PPE) when handling PCB-contaminated equipment and items.

4 When

These requirements take effect 9 December 2019.

5 Where do I find more information

SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001)

- Chapter 32, “Polychlorinated Biphenyls”

Or contact the program manager.

Chapter 32

Polychlorinated Biphenyls

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1 Purpose

The purpose of this program is to reduce contamination from *polychlorinated biphenyls (PCBs)*. It covers labelling, decommissioning, and disposal of PCB-containing and contaminated *equipment* and *items*. It applies to workers, supervisors, equipment owners, and Waste Management.

PCBs are considered a hazardous material/waste. For general requirements on handling, containment, transportation, and disposal, see Chapter 17, "Hazardous Waste", Chapter 40, "Chemical Lifecycle Management", Chapter 52, "Hazardous Materials and Waste Transportation", and Chapter 53, "Chemical Safety". For spill reporting and response requirements, see Chapter 16, "Spills". PCBs in radiologically controlled areas (RCAs) are *mixed waste*. For requirements concerning these, see the Radioactive Waste Manual.

2 Roles and Responsibilities

Functional roles and general responsibilities for each are listed below. More detailed responsibilities and when they apply are provided in the procedures and requirements.

The roles may be performed by one or more individuals and one individual may play more than one role, depending on the structure of the organizations involved. Responsibilities may be delegated.

2.1 Worker

- Reviews tasks with supervisor to determine any PCB-related hazards and applicable controls
- Wears applicable personal protective equipment (PPE)
- Uses safe and environmentally sound work practices
- Immediately reports spills (see Chapter 16, "Spills")

2.2 Supervisor

- Ensures appropriate controls are identified and applied
- Determines appropriate PCB training requirements and qualifications for persons working with PCB equipment
- Ensures proper use of PPE by workers

2.3 Equipment Owner

- Ensures that equipment and items containing oil or PCBs are correctly labeled
- Maintains a preventive maintenance program for equipment
- Contacts the PCB program manager when decommissioning, or recommissioning, equipment or buildings that may contain PCBs or PCB items
- Ensures equipment and items to be disposed of are correctly labeled
- Coordinates disposal with Waste Management

2.4 Waste Management Group

- Coordinates the disposal of non-radiological hazardous waste, including oil contaminated with PCBs
- Maintains the waste disposal records for all PCB-related items

2.5 PCB Program Manager

- Provides guidance on PCB-related issues
- Determines the need for testing and analysis of equipment and items with unknown concentrations of PCBs

3 Procedures, Processes, and Requirements

These documents list the core requirements for this program and describe how to implement them:

- Polychlorinated Biphenyls: General Requirements (SLAC-I-xxx). Describes requirements for labeling, inspection, decommissioning, and disposal of *PCB items* and the use of personal protective equipment

4 Training

There are no training requirements specific to this program.

5 Definitions

area, PCB storage. Designated area for storage of PCB wastes; includes the central Hazardous Waste Storage Area and the waste accumulation areas (see Chapter 17, “Hazardous Waste”)

article, PCB. Any manufactured article, other than a PCB container, containing PCBs and the surfaces of which have been in direct contact with PCBs. Included are capacitors, transformers, electric motors, pumps, pipes, and any other manufactured item (1) that is formed to a specific shape or design during manufacture; (2) the end-use function of which is dependent in whole or in part on its shape or design during end use; and (3) that has experienced either no change of chemical composition during its end use or only those changes of composition that have no commercial purpose separate from that of the PCB article (see 40 CFR 761).

capacitor. A device for accumulating and holding an electric charge and consisting of conductive surfaces separated by a dielectric medium

- *capacitor, large high-voltage*. Any capacitor containing 1.36 kilograms (three pounds) or more of dielectric fluid and operating at or above 2,000 volts (AC or DC)
- *capacitor, large low-voltage*. Any capacitor containing 1.36 kilograms (three pounds) or more of dielectric fluid and operating below 2,000 volts (AC or DC)
- *capacitor, small.* A capacitor containing less than 1.36 kilograms (three pounds) of dielectric fluid. When the amount of dielectric fluid is not known, the following capacitors can be assumed to be small: (1) capacitors with a total volume of less than 1,639 cubic centimeters ($cm^{3)}$ and (2) capacitors with a total volume between 1,639 and 3,278 cm^3 and a total weight of less than 4.08 kilograms (nine pounds).

container, PCB. Any package, can, bottle, bag, barrel, drum, tank, or other device containing PCBs or PCB articles and the surfaces of which have been in direct contact with PCBs

container, PCB article. Any package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB articles or PCB equipment and the surfaces of which have not been in direct contact with PCBs

contaminated, PCB-. A non-liquid material containing PCBs at concentrations ≥50 ppm but <500 ppm; a liquid material containing PCBs at concentrations ≥50 ppm but <500 ppm or where insufficient liquid material is available for analysis, a non-porous surface having a surface concentration >10 µg/100 cm^2 but <100 µg/100 cm^2, measured by a standard wipe test as defined in 40 CFR 761.123

equipment, PCB. Any manufactured item, other than a PCB container or a PCB-article container, containing a PCB article or other PCB equipment

equipment, PCB-contaminated electrical. Any electrical equipment containing between 50 and 500 ppm PCBs. Oil-filled electrical equipment with an undetermined PCB concentration must be assumed to be PCB-contaminated.

dielectric fluid. A fluid with an electrical conductivity less than a millionth of an ohm. Before 1979, PCBs were a common component of dielectric fluid because of their stability and dielectric characteristics.

fluorescent light ballast. A device that electrically controls fluorescent light fixtures. A ballast typically includes a capacitor containing 0.1 kilogram (0.2 pounds) or less of dielectric fluid.

item, PCB. Any *PCB article, PCB-article container, PCB container*, or *PCB equipment* containing, deliberately or unintentionally, PCBs

parts per million (ppm). Unit of concentration expressed as milligrams per kilogram (mg/kg)

polychlorinated biphenyl (PCB). A group of toxic, persistent chemicals used in transformers and capacitors for insulating purposes and in gas pipeline systems as a lubricant. Further sale or new use was banned by law in 1979.

transformer. An electrical device that steps voltage up or down. Older transformers may contain PCBs because PCBs were a common component of dielectric fluid.

- *transformer, PCB.* Any transformer that contains 500 ppm PCBs or greater

- *transformer, mineral-oil PCB.* Any transformer originally designed to contain mineral oil as the dielectric fluid that has between tested and found to contain 500 ppm PCBs or greater
- *transformer, PCB-contaminated.* A transformer with dielectric fluid that contains between 50 and 500 ppm PCBs
- *transformer, non-PCB.* Any transformer containing less than 50 ppm PCBs

6 References

6.1 External Requirements

The following are the external requirements that apply to this program:

- Title 15, *United States Code*, "Commerce and Trade", Chapter 53, "Toxic Substances Control" (15 USC Chapter 53)
- Title 40, *Code of Federal Regulations*, "Protection of the Environment", Chapter 1, "Environmental Protection Agency", Subchapter R, "Toxic Substances Control Act", Part 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions" (40 CFR 761)

6.2 Related Documents

SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001)

- Chapter 16, "Spills"
- Chapter 17, "Hazardous Waste"
- Chapter 40, "Chemical Lifecycle Management"
- Chapter 52, "Hazardous Materials and Waste Transportation"
- Chapter 53, "Chemical Safety"

Other SLAC Documents

- Radioactive Waste Manual (SLAC-I-760-2A08Z-001)

Chapter 32: Polychlorinated Biphenyls

General Requirements

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1 Purpose

The purpose of these requirements is to reduce contamination from *polychlorinated biphenyls (PCBs)*. They cover labeling, decommissioning, and disposal of *PCB items* (defined as any *PCB article*, *PCB-article container*, *PCB container*, or *PCB equipment* containing, deliberately or unintentionally, PCBs) and the use of personal protective equipment. They apply to workers, supervisors, equipment owners, and Waste Management.

2 Requirements

Regulations require that all PCB items, including those stored for use and reuse, must be labeled and inspected as described below.

2.1 Labeling

PCB items must be labeled as follows:

1. Items containing a PCB concentration of 500 ppm or greater must be labeled as *PCB*, using a yellow label with black lettering (see Figure 1).
2. Items containing a PCB concentration of 50 to 499 ppm are recommended to be labeled as *PCB-contaminated*, using an orange label with white lettering.
3. Items containing a PCB concentration of 49 ppm or less are recommended to be labeled non-PCB, using a green label with white lettering.

If the PCB concentration is unknown, testing and analysis may be called for, as determined by the PCB program manager.

Note the yellow label is also required for container of equipment being decommissioned (see Section 2.3) and for PCB-contaminated waste regardless of concentration and areas used to store PCBs and PCB items for disposal (see Section 2.4).

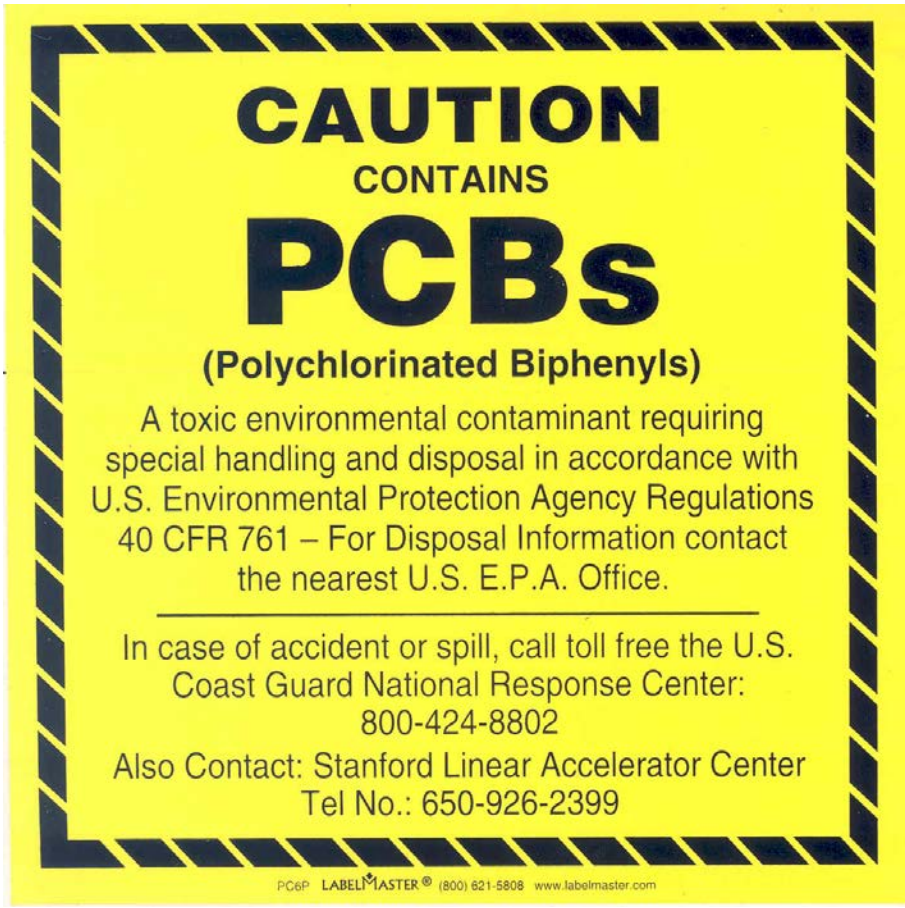

Figure 1 Yellow Label Used to Identify PCB Items

2.1.1 No PCB Label Required

In general, the following kinds of electrical equipment do not contain PCBs and do not require labels:

- Large, low-voltage capacitors
- Small capacitors that are normally used in alternating circuits
- Fluorescent light ballasts marked by the manufacturer as having no PCBs
- Any electrical equipment manufactured after July 2, 1979
- Any electrical equipment for which the PCB concentration has been determined to be below 50 ppm by sampling

2.2 Inspection

Inspection requirements for equipment containing 500 ppm or more PCBs are stringent, but SLAC no longer has any such equipment, so these inspection requirements do not apply.

PCB-contaminated equipment should be inspected by the department that is responsible for it, as part of the department's normal maintenance and inspection efforts.

Equipment and items stored for disposal must be inspected following the storage area inspection requirements of Chapter 17, "Hazardous Waste".

2.3 Decommissioning

When decommissioning, or recommissioning, equipment or buildings that may contain PCBs or PCB items, the owner must contact the PCB program manager.

When PCB equipment is decommissioned

- The date it was taken out of service must be included on the label.
- The presence of PCBs must be indicated on the Hazardous Waste Pickup and Empty Container Request Form used to request pickup by Waste Management.
- The delivered container must be marked with both hazardous waste and yellow PCB labels above (Figure 1).

2.4 Disposal

In addition to the requirements of this program, PCB items declared waste (that is, no longer appropriate for use) must be treated as hazardous waste, meeting the requirements of

- Chapter 17, "Hazardous Waste"
- Chapter 52, "Hazardous Materials and Waste Transportation"

PCB-contaminated waste must be labelled with the yellow label above (Figure 1), regardless of concentration. The primary SLAC waste that contains PCBs is fluorescent light ballasts, but this label is also used for PCB containers that hold such waste as soil, oil, and wipes that have been used to clean a PCB-related spill.

Areas used to store PCBs and PCB items for disposal must be marked as containing PCBs.

2.5 Personnel

There are no general restrictions on personnel working with PCB-containing equipment. PCBs and PCB-contaminated items must be treated, however, as hazardous material/waste.

2.5.1 Personal Protective Equipment

Personnel working with PCB-contaminated equipment and items are required to wear the appropriate personal protective equipment (PPE). Because PCBs bio-accumulate, workers must avoid all exposure to skin and eyes and avoid any potential for accidental ingestion by wearing

- Suitable chemical and/or oil resistant gloves (see the glove manufacturer's specifications for suitability)

- Goggles if there is potential for a chemical or oil splash hazard
- Protective clothing such as a coverall or work apron

2.5.2 PCB Exposure

In case of possible exposure to PCBs, personnel must follow the requirements of Chemical Safety: Accidental Exposure Requirements.

3 Forms

The following are forms required by these requirements:

- None

4 Recordkeeping

The following recordkeeping requirements apply for these requirements:

- Records relative to the disposal of PCBs over each 12-month period are required, including manifests and certificates of disposal. Waste Management retains these.

5 References

SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001)

- Chapter 32, “Polychlorinated Biphenyls”
- Chapter 16, “Spills”
- Chapter 17, “Hazardous Waste”
  - Hazardous Waste Pickup and Empty Container Request Form (SLAC-I-800-0A08R-001)
- Chapter 40, “Chemical Lifecycle Management”
- Chapter 52, “Hazardous Materials and Waste Transportation”
- Chapter 53, “Chemical Safety”
  - Chemical Safety: Accidental Exposure Requirements (SLAC-I-730-0A09S-041)