



Rutgers Environmental Health and Safety (REHS)

Program Name:	Polychlorinated Biphenyls (PCBs) Program		
Responsible Executive:	Executive Director of REHS		
Adopted:	December 24, 2003	Reviewed/Revised:	October 8, 2020

1. Program Statement

Polychlorinated biphenyls (PCBs) were widely used as a fire retardant and insulator in the manufacture of transformers and capacitors due to their ability to withstand exceptionally high temperatures. The Environmental Protection Agency (EPA) banned the use of PCBs in 1979 due to their classification as a human carcinogen and their ability to persist in the environment. Oil-filled transformers and other electrical equipment manufactured prior to 1979 must be tested by REHS prior to disposal. Typical equipment that may contain PCBs or be contaminated with PCBs include:

- X-ray generating equipment in laboratories and medical clinics
- Old high voltage power supplies (transformers, capacitors, switches)
- Vacuum pumps in laboratories and mechanical areas
- Ballasts of old, magnetic T12 fluorescent lighting fixtures

Although much of the equipment manufactured before 1979 is beyond its useful life and likely to have been refilled with mineral oil or replaced with newer equipment, it is still incumbent on REHS to sample all oil-filled equipment prior to disposal.

Light ballasts that may contain PCBs are segregated, labeled and stored in designated areas on each campus before being sent off site to the Rutgers contracted vendor for recycling and/or disposal.

Rutgers laboratories who conduct research on PCBs are permitted to do so but are required to abide by certain requirements including special labeling, disposal and auditing.

2. Reason for Program

This program describes the procedures for managing PCBs at Rutgers in order to protect the faculty, staff, students, visitors and contractors from PCB hazards. It is also designed to ensure compliance with the following regulatory standard:

- *Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce and Use Prohibitions* – 40 CFR Part 761(EPA Toxic Substances Control Act)

3. Who Should Read this Program

This program applies to all Rutgers faculty, students and staff who work with oil-filled equipment or other PCB materials. Utilities, Facilities Maintenance, Housing, Dining, Research Departments and Medical facilities should pay particular attention to the requirements of this program.

4. The Program

I. Roles and Responsibilities

A. Generators/Users of Oil Filled Equipment

- 1) Contact REHS at 848-445-2550 prior to disposal of any oil-filled equipment.
- 2) REHS will evaluate the equipment and determine if sampling is necessary.

B. Utilities Department

- 1) Call **9-1-1** immediately if an oil-filled transformer is on fire or leaking oil onto the ground or into nearby storm drains. The Rutgers University Police Department (RUPD) will contact REHS to respond to the site.
- 2) Maintain an accurate accounting of oil-filled Out of Service electrical equipment.
- 3) Make sure Out of Service electrical equipment is properly stored, tagged and periodically inspected for leakage.
- 4) Contact REHS at 848-445-2550 whenever a determination is made to dispose of oil-filled equipment so that samples of the oil can be taken.
- 5) Coordinate with REHS to have designated transformers drained of oil as needed or disposed of through the Rutgers contract vendor.

C. Facilities Maintenance Department

- 1) Designate areas on each campus to collect and store PCB ballasts and non-PCB ballasts.
- 2) Make sure ballasts are properly stored, labeled and inspected.
- 3) Arrange for proper recycling or disposal through the Rutgers contracted vendor within the 1 year storage limit.

D. Laboratory Personnel

- 1) Notify REHS prior to conducting research on PCBs. EPA regulations require periodic inspections of labs doing research with PCBs along with maintenance of inventories, special labeling and proper disposal.
- 2) Maintain oil-filled vacuum pumps in good working order. Make sure vacuum pumps are placed in secondary containment. Check the secondary containment periodically for evidence of leakage. Contact REHS if leakage occurs.
- 3) Contact REHS at 848-445-2550 for disposal of oil-filled vacuum pumps or any other oil-filled equipment (e.g. x-ray equipment, electron microscopes).

E. Rutgers Environmental Health and Safety (REHS)

- 1) Conduct sampling of oil-filled equipment prior to disposal.
- 2) Arrange for proper disposal of the oil and/or equipment once sample results are received.
- 3) Maintain appropriate documentation of sampling methods, analytical data and disposal including manifests, certificates of disposal, annual PCB document logs, transformer inventory and certificate of analysis for samples.
- 4) Conduct periodic audits of laboratories conducting PCB research and other locations of known use or storage of PCB equipment.

II. Definitions

<i>Capacitor</i>	A device for accumulating and holding a charge of electricity and consisting of conducting surfaces separated by a dielectric oil.
<i>Non-PCB Transformer</i>	Any transformer that contains oil/dielectric fluid less than 50 parts per million (ppm) PCBs
<i>PCB Contaminated Electrical Equipment</i>	Any electrical equipment including but not limited to transformers, capacitors and switches that contain PCBs at concentrations greater than or equal to 50 ppm and less than 500 ppm in the dielectric fluid (oil)
<i>PCB Transformer</i>	Any transformer that contains greater than or equal to 500 ppm PCBs

III. Procedures

A. Sampling Oil-Filled Equipment for PCBs

- 1) The following personal protective and sampling equipment is needed:
 - Safety glasses
 - Disposable coverall
 - Disposable nitrile gloves (double gloves during sampling)
 - Plastic pipettes
 - Drum thief or coliwasa
 - 40 milliliter (ml) sample vial
 - Spare sample bottles or secondary containment bins
 - Oil spill cleanup pads
 - Plastic sealable bags
 - Tools – screwdriver, adjustable wrench/channel locks, drum wrench
- 2) **NEVER SAMPLE EQUIPMENT THAT IS LIVE!** Make sure the equipment is completely de-energized, locked and tagged out prior to sampling.
- 3) Record the following information and maintain documentation at the REHS office:

- Location of equipment
 - Manufacturer and serial number (if not available, create a serial number and mark it on the equipment)
 - Sample date and time
 - Name of person taking the sample
 - Type of analysis requested (PCB)
 - Analytical results
 - Disposal site information
- 4) Put on PPE (disposable coverall, safety glasses, double layer of disposable nitrile gloves). Be sure to replace gloves for each sample to prevent cross-contamination.
 - 5) Collect the sample from the drain plug at the bottom of the equipment or an access port at the top of the equipment. Tools will be necessary to open the plugs/ports.
 - 6) Use a plastic pipette, drum thief or coliwasa when collecting the sample from the top of the equipment. Allow the oil to drain directly into the 40 ml sample vial when sampling from the bottom plug. In some cases, it may be necessary to collect a sample from the bottom drain into a spare sample bottle or secondary containment bin before pipetting into the 40 ml sample vial.
 - 7) Clean up any residual oil with an oil absorbent pad. Place the spent absorbent pad along with used gloves and plastic pipettes into a sealable bag. Mark the bag with the sample number and sample location for future disposal determinations.
 - 8) Label the 40 ml sample vial with the following information:
 - Sample number
 - Sample date and time
 - Sample location
 - Type of analysis requested (PCB)
 - Initials or signature of person taking the sample
 - 9) Complete a chain of custody form for the laboratory that will perform the analysis. The chain of custody form is generally available on the laboratory website.
 - 10) Schedule a pickup of the sample(s) or hand deliver them to the laboratory.
 - 11) Arrange for proper disposal of the oil once sample results are received. See Section C – Disposal and Documentation.

B. Storage and Inspection

- 1) Small quantities (55-gallon drum or less) of PCB wastes that contain ≥ 50 ppm PCBs are stored in the Environmental Services Building (ESB) Cell #7 in secondary containment bins or spill pallets.
- 2) Large PCB equipment such as transformers are stored according to the procedures detailed in Section E – Utilities PCB Procedures.

- 3) PCB wastes that contain ≥ 50 ppm PCBs must be identified by a unique number and Out of Service date (date at which it was determined a waste). The Out of Service date must be clearly marked on the equipment or waste container. All PCB waste must be disposed of within 1 year of the Out of Service date. The 1 year timeframe consists of a maximum storage of 9 months at the ESB and allows 3 months for the disposal/destruction of the PCB waste after it is shipped. The EPA Regional Administrator must be notified in writing with the reasons for delay if the 1 year timeframe is not met.
- 4) Stored PCB items are inspected weekly at the ESB for proper storage and labeling. This inspection is incorporated into the Part B Permit requirement for weekly inspections of all hazardous wastes stored in the Treatment, Storage and Disposal Facility (TSDF).

C. Disposal and Documentation

- 1) Disposal of PCB wastes requires the use of a uniform hazardous waste manifest. Key requirements for manifests are:
 - Weights of PCB wastes must be listed in kilograms (kg)
 - Out of Service dates must be listed
 - For PCB labpacks, the PCB item with the oldest Out of Service date is listed. Individual Out of Service dates can be listed on the packing lists.
 - Copy 3 and 8 are retained in the REHS disposal manifest and PCB binders
 - Manifests are kept indefinitely
- 2) Certificates of Disposal (COD) certify that the PCB waste was ultimately disposed of in accordance with EPA regulations. Key components of a COD are:
 - The identity of the disposal facility by name, address and EPA Identification number
 - The identity of the PCB waste including reference to the manifest number for the shipment
 - A statement which certifies the fact that disposal of the identified PCB waste has occurred including the date of disposal and identification of the disposal process used.
- 3) REHS should receive a COD within 30 days of ultimate disposal. All CODs are kept on file indefinitely.

D. PCB Concentrations and Disposal Methods

- 1) The table below lists the most common types of PCB waste and their respective disposal categories:

Type of PCB Waste	Disposal Vendor	Disposal Method	TSCA* Classification
Oil (<50 ppm)	Rutgers Contract Vendor (RCRA** Facility)	Fuel Blending	Non-PCB (Used Oil)
Oil (50-499 ppm)	Rutgers Contract Vendor (TSCA Facility)	Incineration	PCB Contaminated

Type of PCB Waste	Disposal Vendor	Disposal Method	TSCA* Classification
Oil (≥ 500 ppm)	Rutgers Contract Vendor (TSCA Facility)	Incineration	PCB
Transformer with Oil < 50 ppm	Specialized Reclamation Facility	Recycle Oil/Scrap Metal Carcass	Non-PCB
Transformer with Oil 50-499 ppm	Rutgers Contract Vendor (TSCA Facility)	Incinerate Oil/ Flush Carcass and Scrap	PCB Contaminated
Transformer with Oil ≥ 500 ppm	Rutgers Contract Vendor (TSCA Facility)	Incinerate Oil/ Flush Carcass and Scrap	PCB

*TSCA = Toxic Substance Control Act

**RCRA = Resource Conservation and Recovery Act

E. Utilities PCB Management Procedures

Background: The Utilities Department is responsible for all electrical distribution systems at Rutgers. Periodically transformers and switches are removed from service due to electrical failure and/or equipment upgrades. Once they are taken out of service, the oil must be sampled by REHS to allow for the proper disposal of the oil and carcass. The oil can be drained into 55-gallon drums and Utilities will be left with the transformer carcass. The carcasses are disposed of through an REHS approved disposal facility.

Throughout the late 1980s, the Utilities Department completed an extensive transformer retrofilling project at Rutgers. The project included draining oil from transformers containing ≥ 50 ppm PCBs and replenishing the oil with non-PCB oil so that the final PCB concentration in the transformers was < 50 ppm and therefore reclassified as non-PCB. Due to a phenomenon known as leach-back, it is possible that some of these retrofilled transformers may exceed 50 ppm over time. For this reason, it is imperative that all oil-filled transformers be sampled by REHS prior to disposal.

- 1) Store Out of Service transformers in secondary containment until the unit is disposed.
- 2) Cover or otherwise protect Out of Service transformers from severe weather.
- 3) Clearly mark the outside of the transformers or drums of oil with the Out of Service date and concentration of PCBs (if ≥ 50 ppm).
- 4) Contact REHS at 848-445-2550 to sample oil in transformers that are destined for disposal.
- 5) Coordinate proper disposal of the oil and/or carcass with REHS once the analytical results are received.
- 6) Make arrangements through Utilities to dispose of transformer carcasses which are not regulated (< 50 ppm).

F. Laboratory PCB Management Procedures

- 1) Contact REHS at 848-445-2550 to schedule a consultation prior to conducting any research or laboratory procedures that involve PCBs.

- 2) Provide REHS with all laboratory protocols involving the use of PCBs. Include an inventory of all PCBs along with their concentrations.
- 3) Comply with the following storage requirements:
 - Store PCB items in secondary containment including those kept in refrigerators
 - Mark the containers with the PCB label shown in Figure 1 for all stored items with a concentration ≥ 50 ppm. REHS can provide labels.
 - Post the PCB label on the door(s) to the lab if PCB items inside the lab have a concentration ≥ 50 ppm.
- 4) Request a waste pickup for PCB waste through the REHS online Request for Hazardous Waste Disposal at the following link:

<https://half-life.rutgers.edu/forms/hazwaste.php>

Fig. 1. Rutgers PCB Label

