



Environmental Health & Safety

Oklahoma State University



POLYCHLORINATED BIPHENYLS (PCB) MANAGEMENT PLAN

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Program Overview and General Information

Purpose/Background

The use, storage, and disposal of PCBs are regulated by the Environmental Protection Agency (EPA) under the Toxic Control Substance Act (TSCA) and 40 CFR, Part 761.

Polychlorinated Biphenyls were widely used as a fire retardant and insulator in the manufacture of transformers and capacitors. This was due to their ability to withstand exceptionally high temperatures. Because of their classification as a human carcinogen, the EPA banned their use in 1979. The exception is their regulated use in R&D research. Transformers and capacitors, which were manufactured prior to 1979, found at Oklahoma State University, contain oil, which may contain certain levels parts per million (ppm) of PCBs. Therefore, all oil-filled equipment must be disposed of through Facilities Management and Materials Management. Because of their highly regulated use and disposal, all oils from transformers/power supplies need to be sampled by Facilities Management prior to disposal of the oil and the carcass. Oil filled transformers and capacitors can be found as separate units or in laboratory equipment at the university such as:

- X-ray generating devices and
- Medical X-ray units.

In addition, contaminated oil with PCBs may be found in:

- old high voltage power supplies (transformers) and
- Vacuum pumps.

PCBs can also be found in fluorescent light ballasts. These are managed and can be sent off site for recycling through the Facilities Management and Materials Management departments with universal waste.

Definitions

CFR - Code of Federal Regulations

PCB - Polychlorinated Biphenyls

TSCA - Toxic Substance Control Act

Non-PCB Transformer - any transformer that contains oil/dielectric fluid less than 50 ppm PCB

PCB Contaminated Electrical Equipment - any electrical equipment, including but not limited to, transformers that contain PCBs at concentrations greater than or equal to 50 ppm and < 500 ppm in the contaminated fluid (oil).

PCB Transformer - any transformer that contains greater than or equal to 500 ppm PCB.

Capacitor - a device for accumulating and holding a charge of electricity and consisting of conducting surfaces separated by a dielectric (oil).

PPM - Parts Per Million = mg/l = **mg/kg** - milligrams/kilogram

Generator/User Responsibilities

It is the responsibility of the generator or user of oil filled equipment to contact EHS @ 405.744.3031, prior to off-site disposal of the equipment. Types of common equipment that could contain oil can be referenced in section one. An EHS representative will then evaluate the equipment and make a determination if any sampling prior to disposal is necessary. Details on these requirements can be found in the Facilities Management PCB Management Procedure section of this document.

Laboratory Researcher Responsibilities

The researcher is responsible for notifying EHS prior to the use of PCBs in their laboratory. Details on these requirements can be found in the Laboratory PCB Management Procedure section of this document.

EHS Responsibilities

Facilities Management and Materials Management both have the responsibility to determine if sampling of equipment is necessary prior to disposal. If so, Facilities Management will arrange sampling and submittal of the sample to a certified laboratory for analysis and provide the results report to the Environmental Compliance Program Manager. Once the sample results are received, Materials Management can advise in the setup of the proper disposal of the equipment. In addition, Facilities Management is responsible for maintaining all appropriate documentation. This includes *manifests, certificates of disposal, PCB annual document logs, transformer inventory, and all sample analysis results*. Facilities Management, primarily, and Materials Management is responsible for conducting periodic assessments of PCB practices at the University. This may include: yearly inspections of laboratories that use PCBs, inspection of storage facilities and logged inventory, and inspection of labeling of equipment and storage facility(ies).

Procedures for Sampling of Oil Filled Electrical Equipment for PCBs

Supplies Needed

- Plastic pipettes
- Safety glasses
- Tyvek
- Plastic zip top bags
- 40 ml vial
- Nitrile gloves
- Oil pads
- Tools (screwdriver/adjustable wrenches/channel locks); varies job to job

Before sampling any piece of equipment, make sure that the equipment, which you are sampling, is electrically disconnected.

NEVER SAMPLE EQUIPMENT THAT IS LIVE!

Sample Collection

Before a sample is taken, you need to document the type/location of equipment along with its corresponding manufacturer and serial number. In cases when no serial number is present, the sampler should create one and mark it on the unit. It is suggested that this info be documented on an index card, which contains the following information:

- Location of equipment,
- Manufacturer and serial number,
- Date sampled,
- Time,
- Sample taken by,
- Type of analysis (PCB),
- Results (analysis results), and
- Disposal site information.

This information is maintained in a file at Facilities Management.

Most oil filled equipment has either a drain plug on the bottom of the unit or a plug on the top of the unit where you can access the oil and collect your sample. Note: the use of tools will be necessary to access the oil.

Nitrile gloves should be worn while taking the representative sample of the oil. Double gloves are recommended. Most samples will be grab samples from a specific unit. In addition, make sure gloves are changed out between different samples. This eliminates the chance of cross-contamination.

Samples are taken by using a plastic pipette to extract the oil from the unit and place it in the 40 ml vial.

Once the sample is taken, clean up any excess oil with a piece of oil absorbent pad. Gloves, used pipette(s), and oil absorbent pad(s) should be placed in a plastic zip top bag. The bag should be marked to identify the sample number it is from to allow for proper disposal once the sample results are indicated from the laboratory.

The 40 ml vial should be marked with the identical information that is on the index card. If available, place a label onto the vial or use a permanent marker/sticker.

To submit the sample(s) to the laboratory, you must complete a Chain of Custody Form which accompanies the sample(s) to the laboratory.

Once the Chain of Custody Form is complete, you can call the laboratory to schedule a pickup.

When you receive the sample results back, proper disposal can be arranged with a contractor or Materials Management. See the section of this procedure on disposal on page 8.

Storage and Inspection

Storage

The storage of Polychlorinated Biphenyls are regulated under 40 CFR 761.65. Requirements for storage of PCBs greater than 50 ppm are as follows:

- All PCB wastes, which are greater than 50 ppm are stored prior to disposal at the Driving Range and should be in secondary containment bins/spill pallets. **Note- this only refers to laboratory and 55-gallon drum waste (used oil drums).** Storage requirements for large PCB equipment (transformers) will be discussed later in Section V.
- Storage limitations are as follows - Any PCB waste (>50ppm) in storage must be identified by a unique number and an out of service date. The out of service date refers to the date at which it was determined to dispose of the waste. **It must be clearly written on the item.** All PCB waste must be disposed of (ultimate disposal) within 1year from the out of service date. The 1year timeframe consists of a maximum storage of 9 months at the Driving Range and allows 3 months for the disposal (destruction) after the PCB waste is shipped. If this cannot be achieved, a letter must be sent to the EPA Regional Administrator stating the reason(s) that the 1 year disposal timeframe could not be achieved. The letter will be drafted together with Facilities Management and Materials Management and sent by the Environmental Compliance Program Manager.

Inspections

Inspections for all PCB items in storage at the Driving Range are required to be completed at least once every thirty days according to the regulations (40 CFR 761.65(c)(5)). These inspections can be incorporated into existing TSDF SAA (Treatment, Storage, and Disposal Facilities - Site Accumulation Area) (Driving Range) weekly inspections, which are more frequent than the federal requirement, conducted by designated Facilities Management personnel.

Disposal and Documentation

Manifest Requirements

Disposal of all PCB waste(s) requires the use of a Uniform Manifest. Key requirements for manifests are:

- All weights of PCB wastes listed on the manifest must be in kilograms (kg).
- Out of service dates must be listed on the manifest. In the case of a PCB labpack, the PCB item with the oldest out of service date in the labpack should be listed. In addition, you can list the individual out of service dates on the packing lists.
- Copies 3 and 8 should be kept in the manifest files. In addition, copies are kept in a file along with the PCB files. All manifests are to be kept on file indefinitely.

Certificates of Disposal

Other important documentation is the Certificate of Disposal (COD), which certifies that the particular PCB waste was ultimately disposed of in accordance with the federal 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 the identification of the disposal process used.

In addition, the generator (OSU) should receive a COD within 30 days of material disposal. All CODs are to be kept on file with Materials Management.

PCB Concentrations and Disposal Methods

The table below lists the most common types of PCB waste found and their respective disposal categories.

Type of PCB Waste	Disposal Vendor	Disposal Method	TSCA Classification
Oil (1-49ppm) <50 ppm	University contract vendor (RCRA Facility)	Fuel blending	Non-PCB (e.g. used oil)
Oil (50 ppm - 500 ppm)	University contract vendor (TSCA facility)	Incineration	PCB contaminated
Oil (>500 ppm)	University 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 ppm - 500 ppm)	University contract vendor (TSCA facility)	Incinerate Oil/ Flush Carcass and Scrap	PCB contaminated
Transformer with oil (>500 ppm)	University contract vendor (TSCA facility)	Incinerate oil/ Flush Carcass and Scrap	PCB

Facility's PCB Management Procedures

Background

The Utilities Department within Facilities Management at Oklahoma State University is responsible for all electrical distribution at the University. Periodically, transformers/switches are removed from service throughout the university due to electrical failure and/or equipment upgrades. Once they are taken out of service, the oil in the unit needs to be sampled for PCBs to allow for the proper disposal of the oil and the carcass. EHS can advise and help provide this service along with Facilities Management personnel. The oil will be drained into 55-gallon drums and the Utilities Department will be left with the transformer carcass. The carcass is then disposed of by the Utilities Department by sending it to a TSCA approved facility, if applicable concentration is >50 ppm.

In the past, the Utilities Department completed an extensive retrofitting of all the transformers at Oklahoma State University. This process was likely accomplished by draining each unit which had contained PCBs of 50 ppm or more until the levels in the transformer oil become low enough to reclassify the transformer as NON-PCB (<50 ppm). Each drain is called a cycle. Depending on the levels initially in the transformer, it could have taken up to three or four cycles to get the PCB levels down below 50 ppm. It is important to remember, that over time, levels of PCBs could elevate back to above 50 ppm, which would reclassify the oil and the carcass as PCB and regulate it under TSCA. This phenomenon is called leach-back. The PCBs tend to cling to the side of the units and then leach back into the oil over time. That is why it is so important to sample all transformer oils, as soon as practical, prior to disposal.

In addition, Facilities Management manages the collection and disposal of PCB ballasts. PCB ballasts can be collected and stored in 55-gallon drums at specific locations throughout the university. They are classified as universal waste and can be sent out to an off-site recycler. **For more information on PCB ballasts. Reference the Facilities Management Waste Management Procedures.**

Storage

Transformers and switches that are taken out of service by Utilities should be stored temporarily in secondary containment until the unit(s) are disposed of. The regulations also specify that they should be covered or stored under a roof to prevent rainwater from contacting any PCBs. This is especially important if the PCB levels found in the oil are 50 ppm or more. The date that the unit was taken out of service should be clearly marked on the unit(s)/drum(s) of oil as well and documented if the levels of the PCBs in the oil are found to be 50 ppm or more.

Disposal

Contact EHS for disposal at 405.744.3031. EHS can advise on sampling the oil in the drum(s)/unit(s) to determine its waste classification. Once the sample results are known, Facilities Management and EHS will set up the proper disposal of the oil/unit.

The following disposal requirements apply:

- All TSCA regulated oils and transformer/switch carcasses are disposed of through Materials Management and Facilities Management.

- All used oil drums from transformers/switches are picked up and managed by Materials Management.
- Transformer/Switch carcasses which are not TSCA regulated (< 50 ppm) are disposed of through the Utilities department.

Laboratory PCB Management Procedure

Prior Notification

Any laboratory researcher that plans to use any amount of PCBs in their laboratory must contact Materials Management at 405.744.3031 prior to their use. A Materials Management representative will then set up an appointment to discuss the precautions and safeguards with the laboratory PI.

Provide Protocols

Each laboratory that uses PCBs must submit a summary of their research with PCBs to EHS. The summary must include an inventory of the specific PCB items stored in the laboratory as well as the levels of the PCB's stored in the laboratory.

Laboratory Storage Requirements

Laboratories must meet the following storage requirements:

- All PCB items in the laboratory are to be stored in secondary containment. This includes PCB items stored in refrigerators.
- If PCB items in storage contain PCB levels of 50 ppm or greater, the storage container/area must be marked with the PCB label.
- If any PCB items used in the laboratory contain PCB levels of 50 ppm or greater, the door(s) to the laboratory must be marked (posted) with the PCB label. These are available from EHS.

Disposal/Request Waste Pickup

All requests for PCB laboratory waste can be completed by using the Chemical Removal Request Form which can be accessed from the EHS web page at <https://ehs.okstate.edu/> and emailing the form to ehs@okstate.edu.