

Webinar Report

Introduction to PCBs and Development of Comprehensive PCB Inventories for National Implementation Plans

28 October 2024



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Introduction

This is the ninth event in the series of training activities to be held by the Green Growth Knowledge Partnership (GGKP) within the framework of Component 4 (Knowledge management and information sharing) to share the knowledge developed under Components 1 and 2 of the GEF project ID 10875, entitled Global Development, Review and Update of National Implementation Plans (NIPs) under the Stockholm Convention (SC) on Persistent Organic Pollutants (POPs).

This webinar provided a comprehensive overview of polychlorinated biphenyls (PCBs), focusing on their toxicity and environmental impact. The session focused on the essential steps for developing PCB inventories, including identification, tracking, and record management. Key practices for handling PCB-containing equipment, safe packaging, transportation, and interim storage were shared.

The webinar also discussed disposal technologies for proper management (like plasma arc systems) and disposal of PCB-containing equipment, in alignment with the guidelines set forth by the Stockholm Convention. Emphasis will be placed on the global phase-out efforts of PCBs by 2025, ensuring participants understand regulatory compliance and ongoing initiatives to minimize and ultimately eliminate PCB pollution through safe disposal technologies.

CET 14:00	Welcome and Opening Remarks	Anastasiya Buchok , Component 4, GGKP
14:10	Introduction to PCBs, its environmental and health impacts. Steps of PCB inventory development	Thomas Paramanandam , Additional Director (rtd), Central Power Research Institute
14:40	PCB identification, tracking, and record management	
15:00	PCB and PCB-containing equipment management, including interim storage, packaging, and transportation	
15:30	Disposal of PCBs, PCB-containing equipment and PCB waste. Available PCB destruction technologies	
15:40	Panel discussion and Q&A session	Thomas Paramanandam , Additional Director (rtd), Central Power Research Institute Urs K. Wagner , Senior International PCB & Asbestos Expert, ETI Environmental Technology Ltd., Switzerland Eaint Me Me , Staff Officer, Ministry of Natural Resources and Environmental Conservation, Myanmar
16: 00	Closing remarks	Anastasiya Buchok , Component 4, GGKP

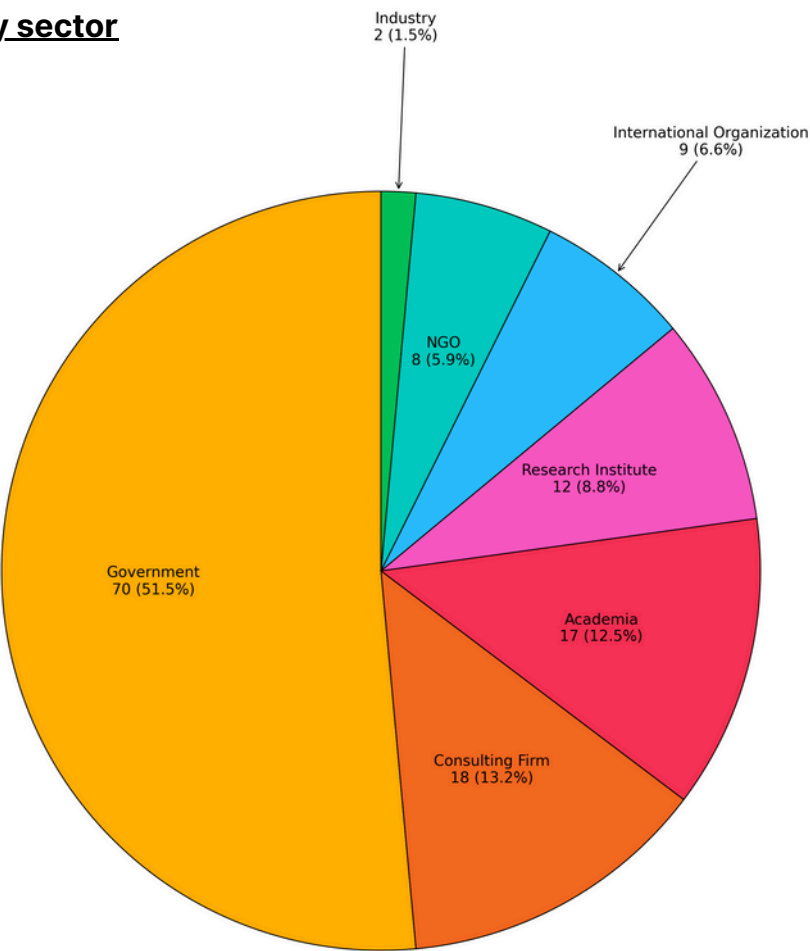
Registration and Attendance

Number of registrants: 174 / Total attendance: 136
(Approx. 48% female and 52% male)

Participants by country

Country	Attendees	Country	Attendees	Country	Attendees
Ethiopia	14	Uruguay	3	Turkey	1
Albania	12	Guinea	2	Uganda	1
South Africa	8	Bolivia	2	United States	1
Myanmar	8	Kazakhstan	2	Sudan	1
Togo	6	United Kingdom	2	Burundi	1
Bosnia and Herzegovina	5	Republic of Korea	2	Georgia	1
Bahamas	5	Lao PDR	2	Sierra Leone	1
Switzerland	4	Senegal	2	Philippines	1
Saudi Arabia	4	India	2	Germany	1
North Macedonia	4	Republic of Moldova	2	Dominica	1
Madagascar	4	Belgium	1	Nigeria	1
Côte d'Ivoire	3	Tanzania	1	Ghana	1
Montenegro	3	Thailand	1	Maldives	1
Brazil	3	Honduras	1	China	1
Slovakia	3	Trinidad and Tobago	1	Kenya	1
Peru	3	Tunisia	1	Japan	1
Cameroon	3	Costa Rica	1	Cambodia	1

Participants by sector



Key Highlights

Polychlorinated Biphenyls (PCBs) are a group of synthetic organic chemicals composed of carbon, hydrogen and chlorine atoms. These chemicals were widely used from 1929 to 1978 due to their non-flammable properties, chemical stability and insulating capabilities. PCBs were extensively applied in dielectric fluids for transformers and capacitors (60%), industrial fluids for hydraulic systems and gas turbines (15%), and adhesives, textiles and sealants (25%). Despite their widespread use, PCBs pose severe environmental and health risks, leading to their global phase-out under the Stockholm Convention.

During the webinar, key steps for comprehensive PCB inventory were explored, as essential action items for identifying, tracking, and safely managing PCB-containing equipment and waste. The inventory process includes:

- Pre-inventory preparation: Planning site selection and communication strategies.
- Data collection: Direct (on-site testing) or indirect (historical records, equipment labeling).
- Data management: Documenting PCB levels, equipment location and waste categorization.

Effective PCB management also requires clear communication with stakeholders, including government agencies, industries and the public, to ensure safe handling, storage and disposal. Experts highlighted that stakeholder education through brochures, online resources, workshops and seminars plays a crucial role in raising awareness about PCB risks, regulatory compliance and best management practices.

PCBs guidelines

• PCBs identification, tracking and record keeping

The purpose of placing a label is to facilitate the identification of PCBs containing equipment. It is important to ensure that the operators and general public are informed of the existence of PCBs containing equipment in their factory so that they can adopt suitable management measures as required. Labels must include information about the contact reference, e.g., the person in charge of emergency response and handling, transporting, and disposal of PCB waste.

• PCBs, PCB containing equipment, packaging, and transportation

Follow the existing legislation in your country for proper packaging and transportation.

Examples:

- Motor vehicle acts: Hazardous waste rule
- Packaging of PCB: Marking and labelling, etc.
- Transportation of PCBs: Vehicle and driver requirement
- Training: Handling and transportation of PCBs

• PCBs, PCB-containing equipment and PCBs waste interim storage

The larger the size of PCB storage, the greater the risk associated with the infrastructure. Therefore, setting up multiple temporary storage facilities close to the site would be a good option. Storage capacity depends on the amount of PCBs which may be disposed over a certain time.

- Avoid storage: Fire, flood, earthquake and leakage

Key Highlights

PCBs, PCB-containing equipment and PCB-waste disposal

Based on provisions for POPs disposal, a technology should:

- Prevent the formation of dioxins, furans and other by-product POPs.
- Not generate any wastes with POPs characteristics.
- Not utilize any POPs disposal methods that are non-destructive, such as landfilling or recycling in any form.

Destruction technologies for PCBs

Technologies for PCB destruction should be capable of effectively 100% treatment efficiency and contain all process streams for testing and reprocessing if necessary. Non-incineration technologies have been demonstrated to effectively treat and destroy PCBs and other POPs. Alternatives to incineration: Plasma is one of the commercially available options.

Questions and Answers

Q1. Does the inventory for the NIP Update include testing?

Dr. Thomas Paramanandam: Yes, both testing the samples from the transformers which are in operation, and which are idle (decommissioned/out of operation) should be done.

Q2. When talking about PCB conc lower than 50ppm, do you mean the sum of all congeners? Which congeners should be calculated for the threshold of 50ppm? All of them, only indicator ones, or only dioxin-like ones

Dr. Thomas Paramanandam: From the inventory, the PCB congeners identified are 1258 and 1260 types indicating around 58 and 60 congeners present. However, all the congeners found in the transformers/capacitors shall be taken into account.

Q3. Is there any plus or minus option while we apply the assumption rule?

Dr. Thomas Paramanandam: For preliminary screening, it is important to make sure whether this equipment has a factory nameplate. If not, then it should be checked whether it was manufactured after 1993, and if yes it might have a PCB-free certificate from the manufacturer or other record. If not, it should be sampled. Otherwise, if there are no details about transformers/capacitors available, it can be assumed that it is PCB transformers. Further, the presence of PCBs can be verified through GC-ECD analysis. Further, the presence of PCBs can be verified through GC-ECD analysis.

Q4. What is the approach of including the sealed units in the inventory? What is the approach of including the sealed units in the inventory as they have no sampling points and breaking into them will render them dysfunctional?

Dr. Thomas Paramanandam: You may check the information on the nameplate of the equipment itself or from the maintenance records. That will help to identify whether it contains PCBs or not. If there is no information available, this equipment can be assumed as PCB-containing equipment and included in the inventory. The assumption rule yet doesn't exclude the further need for PCB analysis.

Q5. Could you clarify the techniques for analyzing PCBs in transformers?

Dr. Thomas Paramanandam: Gas chromatography (GC) with the electron capture detector (GC-ECD) is used for detecting PCBs. This method is more reliable and accurate.

Q6. Is it necessary to follow all the steps of PCB analysis to confirm the status of a transformer?

Dr. Thomas Paramanandam: To confirm, it is recommended to follow all the steps. Just by analyzing PCBs using gas chromatography with an electron capture detector (GC-ECD) one can easily confirm the presence of PCBs.

Questions and Answers

Q7. How do you use the tubes to collect hot samples? To use them, does the transformer need to be de-energized? When and how should they be used?

Dr. Thomas Paramanandam: There is no need to turn off the transformers for sampling. Simple tubes with proper lids are required while sampling. Please make sure to avoid spillage/leak and use proper protective equipment while sampling. For more details please kindly refer to the SC guidance on PCB inventories: (UNEP, Guidance for Development of PCB Inventories and Analysis of PCB, 2023, p.19) "Usually, transformers are sampled when they are in use and thus when they are electrically alive. Relevant protective measures and safety regulations must be known and applied at all times! If the oil quality is to be tested, the following steps have to be considered: • Sampling via drain tap: Drain off about 1 L of oil first to clean the drain from particles that might have accumulated in that area; • Amount of oil required: 0.2 L to 1 L (in case of oil quality analysis); • Leave the oil for 24 hours to allow particles and water to settle; • Take a sample from the upper third of the oil for the analysis using a pipette; • Return the drained oil to the transformer (only if the oil filling cap is out of reach of the high voltage and the oil is without heavy impurities, otherwise shut off the transformer before refilling the oil)."

Q8. What are the sampling and analysis protocols for open systems?

Dr. Thomas Paramanandam: It is easy to sample from the open systems. Analysis of PCBs varies depending on where the PCB is present. If you are testing PCBs in soil, paint, varnish, sealants, etc., follow different test methods for each matrix.

Q9. Can we have a ranking of these technologies based on the best technologies?

Dr. Thomas Paramanandam: Non-combustion technologies that are environmentally sound are considered the most preferable technologies.

Q10. How do you identify the PCB-contaminated sites?

Dr. Thomas Paramanandam: There are many ways to identify contaminated transformers/sites. If there is a leak in the PCB-filled transformers, it would have been filled with other oils, thereby it is assumed to be contaminated PCB transformers instead of pure PCB transformers. Another way is that only one piece of equipment would have been used for carrying out condition monitoring by filtration for all the transformers including PCB-filled transformers, then all transformers are contaminated. Transformers have PCB contamination ranging from 50-10,000 ppm.

Resources

- A concept note, presentation materials and video recording in **English**, **Spanish**, **French** and **Russian**, and the presentation slides of the webinar are available on the **Global NIP Update platform**:

<https://www.greenpolicyplatform.org/webinar/introduction-pcbs-and-development-comprehensive-pcb-inventories-national-implementation>



Spanish



French



Russian



- **Q&A brief on Green Forum:** <https://thegreenforum.org/post/thank-you-everyone-who-joined-our-ggkp-webinar-october-28-where-we-delved-pcb-inventories>
- **Stockholm Convention Secretariat has released an updated form for PCB inventories:**
<https://chm.pops.int/Implementation/IndustrialPOPs/PCB/Guidance/tabid/665/ctl/Download/mid/26507/Default.aspx?id=6&ObjID=34091>

If you have any questions or comments, please contact the GGKP team.

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