

Reduction & Elimination of Polychlorinated Biphenyls (PCBs): Prioritizing the Power Sector in India”

Project Sponsored By
Ministry of Environment, Forest & Climate
Change (MoEFCC), United Nations Industrial
Development Organization (UNIDO) &
Global Environment Facility (GEF)

Project Implemented By:
Central Power Research Institute (CPRI)



Are you aware that life on the planet is threatened?

Yes! Global warming, hazardous and toxic chemicals are really threatening sustained life on the planet. Large quantities of carbon dioxide and number of hazardous and toxic chemicals are creating a shift in the environment causing irreversible damage to the environment. A Hazardous and Persistent chemical such as Polychlorinated Biphenyls is one among them.

1. What are Polychlorinated Biphenyls (PCBs)?

PCBs belong to a family of man-made organic chemicals such as chlorinated hydrocarbons that were widely used in the past since 1920's, mainly in electrical equipment. PCBs production was banned worldwide at the end of the 1970s.

2. Why were PCBs banned?

PCBs have been demonstrated to cause cancer, as well as a variety of other adverse health effects on the immune system, reproductive system, nervous system, and endocrine system.

3. If PCBs is hazardous, why were PCBs used at all?

Due to their non-flammability, chemical stability, high boiling point, and good electrical insulating properties, PCBs were used in various industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper. Consequences of its harmful properties were not known for a long time till the late 70's.

4. What happened to those old PCBs?

Mostly thrown away. People did not know that PCB was hazardous, and so when the equipment became old or failed, the oils were either burnt off in boilers, stored in drums,

thrown into the ground/water or reused and many tons are still available in transformers which are still in service. In fact, PCB cannot be burnt at ordinary flame conditions without serious side effects concerning environment: it needs specialized pyrolysis equipment to completely burn at temperature $>2000^{\circ}\text{C}$. Partly burnt PCBs produce other hazardous chemicals which then go into soil. Let us now dispose what PCB we still have in India (more than 10,000 tons!) in an environmentally safe manner: please do not attempt to burn PCB or throw into soil or water.

5. Where are PCBs found currently?

Equipment such as transformers, capacitor banks, & voltage regulators etc. or products such as plasticizers used in plants & cements, cable insulations, adhesives & tapes, oil based paints: only those made before 80s.

6. What are the physical properties of PCBs?

Yellow or brownish oily liquids that don't easily burn, with no smell: may sometimes smell like motor oil

7. Hazardous effects of PCBs

- Carcinogenic (causes cancer)
- Causes genetic modification
- Severe Skin rashes
- Liver damage
- Irregular menstrual cycle
- Lowered immune response
- Poor cognitive development
- Stomach and thyroid gland injuries
- Deformation in Babies born to women who are exposed to relatively high level of PCB

8. If PCB is thrown in soil and water, how does it get transmitted in humans or animals?

PCB's can travel very long distances without undergoing any change and reach large water bodies like oceans and unimaginable places like Arctic and Antarctic region. PCB's accumulate in fatty tissues of animals. Being non-bi degradable they persist for long period of time in environment and enter the food chain through water and soil: consuming food of PCB affected plants and water (fish) transfers the PCB into our systems. They also get absorbed through skin during handling of chemicals & inhalation of its vapors.

9. How to know if any equipment contains PCBs?

By looking at the nameplates of the equipment for trade name and year of manufacture - if it was manufactured before 1980, it is likely to contain PCB. If no information is available, why take risk? Simply show this hand out to your seniors and request them to contact the organization that eliminates PCB.

10. By the way, who eliminates PCBs in safely India?

Central Power Research Institute (CPRI), a Govt. of India organization under the Ministry of Power (MOP) is identified by the UNIDO (United Nations Industrial Development Organization) and MoEFCC (Ministry of Environment & Forests and Climate Change (Govt. of India) as a Nodal Agency to take measures in identification of PCBs in the country and take measures to dispose them under an Environmentally Safe Management (ESM) process.

11. What is the role of CPRI?

- Creating awareness about hazards of PCBs
- Interact with all industries to assess the number and condition of PCBs containing equipment
- Inform the organization and its staff who handle the equipment about the harmful effects of PCBs and train them to handle the equipment and oil in a safe manner.
- Take appropriate and adequate steps to coordinate the efforts needed to dispose the PCBs.

12. Why am I being told about PCBs?

India is a signatory to the international environmental treaty, the 'Stockholm Convention on Persistent Organic Pollutants' under which it is the moral responsibility of our country to eliminate this toxic and hazardous chemical from the Indian environment. An endeavor is being made through this hand out to reach out to each citizen of the country and to provide awareness about the hazards posed by PCBs so that each one of us may contribute (via giving information and being safe) towards the elimination of this hazardous chemical and so that our children are safe and free from the effects of the hazards of PCBs.

13. I am an individual: how can I help?

You can do a lot. You may be a technician or in some way associated with electrical equipment. Even when not working, you may see an old equipment with such a nameplate in a yard or substation. You may then distribute a copy of this handout to a concerned authority. Ensure that you will not handle or touch with bare hands, any oil that may be present in any electrical equipment (such as a transformer) that has been manufactured before 1980. You may even inform your colleague or friend and have a discussion and thereby spread awareness.

14. How can CPRI tell every person in India that PCBs is hazardous and to be handled in a ESM?

Through communication such as

- Awareness raising program
- Training program
- Through tele-media
- Through sending letters and emails to industries
- Distributing flyers like what you are reading now

Joint Director & Head,
PCB Cell, Dielectric Materials Division,
Central Power Research Institute

15. What steps are being taken by CPRI to eliminate PCBs completely from the Indian environment?

- Visit & Identify PCBs filled equipment in industries; inspect their condition (leaking, stored etc.).
- Training field officers in industries to handle PCBs.
- Implement destruction or decontamination technology to eliminate PCB completely under an ESM process.

16. How do we know if any fruit, vegetable or sea food is contaminated with PCBs?

There is no direct method of knowing this. The only way to determine presence of PCBs in a food item is through chemical analysis. Fortunately awareness about PCBs is growing and so far no major issues have been found in the Indian environment due to PCBs.

17. Any test to know if I am exposed to PCBs?

Doctors can do blood test to evaluate exposure to PCB; blood test is expensive and not always locally available.

18. What are the safety precautions to be taken in handling PCBs?

Using personnel protective equipment such as gloves, mask, goggles, lab coat, shoes etc.

19. What to do if a PCBs leak or spill happens?

- Rope the area off - only cleanup workers will enter
- Use absorbent materials to soak up the spill. Avoid contact with these materials
- Do not allow PCBs to enter water drainage system
- Use an organic solvent (kerosene, for example) to wipe off smooth hard surfaces of non-disposable objects. Surfaces such as cloth, wood, and concrete absorb PCBs; they cannot be completely cleaned
- Dispose of contaminated objects & cleanup materials (rags, absorbent particles, damaged equipment, disposable protective clothing, etc.) by wrapping them in layers of newspaper, then sealing them in thick double-wrapped plastic bags
- Contact CPRI for further action

20. What benefits does CPRI get from this work?

CPRI is a Government of India Organization which will not work for any commercial benefit. CPRI, MoEFCC and UNIDO are working together for a national and global safety and environmental preservation.

Our goal is ultimately to have a PCBs free Nation. Please support our mission.

If you have further questions or suspect the presence of PCBs in any locality, please contact:

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