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Fact Sheet



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Polychlorinated Biphenyls (PCBs)

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PCBs (polychlorinated biphenyls) have been widely used since the 1930s, because of their

excellent electrical- and temperature-insulating abilities. For many years, PCBs were considered to be almost non-toxic, since there were very few reports of illness even among industrial workers who were exposed to fairly large amounts. In 1978, the Environmental Protection Agency (EPA) began to impose bans on PCB manufacturing and sales and on most PCB uses. Nevertheless, it is still possible for workers to be exposed to PCBs, either through servicing and handling equipment that contains PCBs, or as a result of leaks, spills, and fires. This fact sheet answers some of the most frequently asked questions about PCBs.

• Why did the EPA ban PCBs?

The toxic effects of PCBs first drew attention in 1968, when over 1200 people in Japan were poisoned by eating food cooked in oil that was heavily contaminated with PCBs and other chemicals. This caused illnesses which became known as Yusho (rice oil) disease. Soon afterward, studies showed that PCBs cause cancer in test animals. Therefore, it is considered likely that PCBs can cause cancer in humans.

But why were PCBs banned, while many other chemicals which also cause cancer in test animals were not? PCBs remain in the environment for a long time, because they do not break down. Also, their elimination from the body is very slow, so that levels in body tissues may increase with time. Thus, PCBs build up in the food chain, so that the fish and animals we eat could contain significant amounts.

In short, the thing that sets PCBs apart from other equally toxic industrial chemicals is the ability of PCBs to persist in the environment and accumulate in the body and the food chain.

• Where are PCBs found?

PCBs were used mainly in electrical transformers and capacitors, heat transfer systems, and hydraulic systems. They were also used in inks and carbonless copy paper and for a variety of other purposes, but the EPA ban now prohibits almost all of these other uses. Nowadays, PCBs are found mostly in transformers and capacitors. These may be contained in industrial equipment (such as welding equipment), medical equipment (such as X-ray machines), and household appliances (such as refrigerators and microwave ovens).

The ballasts of some fluorescent light fixtures contain PCBs. During normal operation of a fluorescent light, the PCBs are entirely enclosed, and you cannot be exposed to them. However, when the capacitor wears out, sometimes it may burn or break and leak PCBs.

• How can I tell whether a piece of equipment contains PCBs?

Check for a manufacturer's label, which may give the date of manufacture and the trade name of the

fluid. Some trade names that may refer to PCBs include Aroclor, Askarel, Eucarel, Pyranol, Dykanol, Clorphen, Clorinol, Chlorextol, Diaclor, Hyvol, Asbestol, Inerteen, Elemex, Saf-T-Kuhl, No-Flanol, Nepolin, EEC-18, and others. Equipment manufactured after 1979 usually does not contain PCBs. Most pre-1979 capacitors do contain PCBs, while many pre-1979 transformers do not. Transformers within buildings or vaults are more likely to contain PCBs. New equipment should be labeled "No PCBs." PCBs are clear, amber-colored, or dark oily liquids. They may have a faint smell like motor oil, and some contain chlorobenzenes which make them smell like mothballs. Fluorescent light ballasts may contain about an ounce of PCBs; a utility pole capacitor or transformer may contain much more. Usually what leaks from a burned-out light ballast is not PCBs but a black tarry material that is used to muffle noise from the capacitor. However, it is safest to assume that anything that leaks from a transformer, capacitor, or light ballast contains PCBs, unless there is a "No PCBs" label on the equipment.

• **What should be done in case of a PCB leak or spill?**

- 1. Rope the area off so that only cleanup workers will enter.
- 2. Use absorbent materials to soak up the spill. Avoid contact with these materials.
- 3. Do **not** allow PCBs to enter a water drainage system.
- 4. 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.
- 5. Dispose of contaminated objects and cleanup materials (rags, absorbent particles, damaged equipment, disposable protective clothing, etc.) by wrapping them in layers of newspaper, then sealing them in impermeable containers such as heavy double-wrapped plastic bags. Contact the Environmental Protection Agency and the Toxic Substances Control Division (TSCD) at the telephone numbers below for instructions on how to dispose of them.
- Environmental Protection Agency Toll Free: (866) EPA-WEST
- TSCD Southern California (213) 620-2380
- TSCD North Coast California (415) 540-2043
- TSCD Northern California (916) 739-3145

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- **How might I be exposed to PCBs?**

PCBs are easily absorbed through the skin, so direct contact with PCB oils is one way you could be exposed. Another way is by inhaling PCB vapors from overheated equipment that contains PCBs. PCBs normally don't evaporate much, so there are hardly any vapors to inhale unless the PCBs are heated. Finally, most of us absorb small amounts of PCBs from the food we eat. It is important to understand that PCBs are like most other cancer-causing agents - with small exposures, there is very little increase in cancer risk.

- **If I get exposed to PCBs what should I do?**

If PCBs contact your skin, remove any contaminated clothing and wash the skin immediately with soap and water. Don't use an organic solvent such as kerosene, paint thinner, or degreaser to wash PCBs off your skin; that could increase the absorption of PCBs through your skin. Dispose of heavily contaminated clothing as described above; very lightly contaminated clothing can be washed with detergent, separately from other clothes. You do not need to see a doctor unless you develop a severe skin rash, which is unlikely. If PCBs get in your eyes, flush your eyes with water for 15 minutes and then see a doctor.

- **Is there any way to measure the effect**

of PCB exposure on my health?

No. There is no test that can measure or predict the health effects of a person's PCB exposure. PCB levels in blood or body fat can be measured, but no one knows what any given level of PCBs in the blood or fat means. Also, these tests are expensive and are not always accurate. Although PCBs can affect the levels in your blood of certain enzymes made by your liver, there is no reliable way to relate these levels to PCB exposure. Many other chemicals, especially alcohol, affect liver enzyme levels much more than PCBs do. Therefore, none of these tests is recommended as a test for PCB effects.

- **Is there any treatment for PCB exposure?**

No. Once PCBs enter your body, there is no way to remove them. They will naturally be slowly eliminated from your body. There is no evidence that weight-loss programs or saunas can speed up their elimination.

- **Compared to other cancer-causing agents,**

how toxic are PCBs?

In terms of their ability to cause cancer in animals, PCBs are in the middle range. That is, small doses don't have any detectable effect, but very large doses clearly cause an increase in animal cancer rates. We don't know whether PCBs can cause cancer in humans. Some workers have been heavily exposed to PCBs, because for many years PCBs were believed to be among the safest of industrial chemicals. Victims of Yusho disease were exposed to even greater amounts. Studies of these groups of heavily exposed people have given limited evidence of an increased cancer risk. It seems clear that an occasional exposure to PCBs will not substantially increase your chance of getting cancer during your lifetime. However, it is sensible to avoid exposure whenever possible.

- **Do PCBs have any other health effects?**

Years ago, many workers were frequently exposed to PCBs without proper protection. Some of them developed chloracne, a painful and persistent form of acne. Other than the possible increase in cancer rates, this is the only health effect that has been found in people who work with PCBs.

Some people have reported skin and eye irritation, headaches, or nausea. These effects are usually associated with PCB fires, where other chemicals are involved.

A variety of other symptoms were seen in Yusho victims, but these people had eaten substantial amounts of PCBs and other more toxic chemicals, such as dioxins. Now that most PCB uses have been banned, no one is likely to be exposed to large amounts.

• What can I do to prevent exposure to PCB

1. Check equipment labels to determine whether the equipment contains PCBs. Make sure that all equipment that contains PCBs is labeled according to Environmental Protection Agency requirements. For information on EPA's rules for labeling and handling of PCBs, call Toll Free: (866) EPA-WEST.
2. Before you handle equipment that contains PCBs, inspect it for leaks or damage.
3. Avoid skin or eye contact with PCBs. If you might come in contact with PCBs, wear gloves, boots, goggles, or other protective clothing. Protective clothing should be made of materials that are resistant to PCBs, such as Viton, Saranex, polyethylene, polyvinyl alcohol, polytetrafluorethylene, butyl rubber, nitril rubber, nuprene. Polyvinyl chloride and natural rubber (latex) are not recommended materials. PCBs will soak through almost any protective clothing materials within hours, so disposable clothing is best. If dust contaminated with PCBs might be present, wear a respirator.
4. Wash carefully with soap and water after you remove your protective equipment or clothing.
5. Don't try to clean up a PCB leak yourself -- notify someone who has been trained to handle PCB cleanups.
6. If electrical equipment containing PCBs is involved in a fire, PCB vapors or combustion products may be released (see below).

Ventilate the area thoroughly before entering, or wear a NIOSH-approved respirator with a combined dust- and- organic vapor filter cartridge. Your sense of smell will not warn you that PCB vapors are present.

- **Is PCB exposure especially hazardous for a pregnant woman?**

PCBs do not cause birth defects, judging from animal experiments and from studies of Yusho victims who were exposed while pregnant. However, a pregnant woman's exposure to large amounts of PCBs could affect the subsequent health of her baby and could cause spontaneous abortion or miscarriage if the exposure levels are high enough to make the mother sick. In animals, high doses of PCBs can also reduce fertility. Exposure of humans to these large amounts of PCBs is very unlikely nowadays.

- **What if PCBs are involved in a fire?**

When PCBs are burned, they can form polychlorinated dibenzofurans (PCDFs) and polychlorinated dibenzodioxins (PCDDs). Some of these compounds are far more toxic and cancer-causing than PCBs, and they can be the main hazard from a PCB fire. Fortunately, only very small amounts of these compounds are usually created. Like PCBs, they usually cause no short-term health effects (except chloracne if exposure is very large). Also, as with PCBs, there is no useful way to measure or predict health effects, there is no treatment for an exposed person, and a single exposure would not substantially increase your lifetime risk of getting cancer.