

Adverse Reproductive Outcome Discussion **(Health Effects of Electrical Grade PCBs)**

I. General problems with documents
A. It is impossible to discuss PCB related problems in isolation. Various amounts of PCDF are always found with PCB.

B. Many isomers of PCB are found in any mixture of PCBs, some of which are extremely toxic.

C. The fate of PCB in nature. Beside bioaccumulation is not clear. For example, photooxidation of PCB to PCDF does occur (Nutsinger 1974), but the probability of such occurrence in nature is not known.

D. Heating of PCBs as would occur with PCB use in heat exchangers results in increased conversion to PCDF. It is not clear how they address this issue and its inherent risk. How hot do capacitors and "closed" systems get in their life time. What conversion occurs?

E. Given the limits of our attempts to eliminate the remaining PCBs in the environment, its transport through the food chain, uncertain chemical transformations, and worrisome persistence in the animal world as the type of chlorination changes and the degree increases, it appears extremely unwise to change any position without much further work at the health and basic chemical level.

II. Deficiencies in consideration of reproductive effects

A. Increased estrogen effect may be seen via two different mechanisms.

1. Estrogen like activity which would add to or compete with endogenous estrogens (uterotrophic activity in rats, Gallatt 1978).

2. Increased metabolism of endogenous estrogens through PCB effect on hepatic MFO system. These types of effects could easily account for menstrual irregularities seen as well as impair the ability to maintain the fetus.

B. Animal studies Ringer 1972, Linder 1974, Villeneuve 1971 show pronounced fertility problems depending upon PCB type and animal species at less than 50 ppm PCB.

C. Effects on humans

1. Yusho cooking oil incident showing low birth weight/developmental delays is of concern. Reproductive effects are seen in rhesus monkeys at 2.5-5.0 ppm by purified PCBs and in the mink, a sensitive animal species. Thus, although PCDF is admittedly dangerous PCB is not "obviously" safe.

2. Reproductive effects are being investigated in a group of women who work with capacitor grade PCBs in an Edison facility. Increased rate of low birth weight infants is one outcome under investigation by NIOSH. This type of study as well as one addressing incidence of infants with developmental delays are needed.

D. General health vs PCB

1. Given the problems of small numbers and our presently inadequate ability to address reproductive health questions of menstrual irregularities, decreased fertility, developmental delays and minimal brain dysfunction, animal studies must be given perhaps additional weight.

2. Each PCB mixture contains as many as 70 different compounds and has unique characteristics which represent a separate risk independent of its later chemical fate. Chemical transformations during use and after disposal represent yet another risk needing evaluation recognizing the uniqueness of each environmental situation.