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Technology review

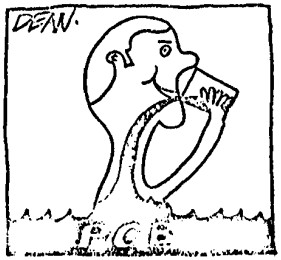
US losing fight against PCBs - a new cancer risk?

Despite three years of government regulation, the battle to reduce PCBs in the US environment is being lost. This is all the more disturbing because of new evidence that PCBs may be carcinogenic, making them potentially much more dangerous to human health than previously believed.

PCBs—*polychlorinated biphenyls*—were once widespread in industry, popular because of the non-flammability and dielectric properties as cooling fluids in electrical transformers, lubricants, sealants, plasticisers, pesticide extenders, and in a host of other roles. First introduced in 1929, they were unregulated until 1971, when mounting evidence of environmental damage led Monsanto, sole US manufacturer, voluntarily to limit sales of PCBs to customers using processes from which PCBs are recoverable without discharge to environment. In 1972, US government agencies instituted a variety of measures to control PCBs.

Despite the seemingly favourable circumstance of only one PCB manufacturer, regulation in the US has not worked. Last week, Dr John Buckley, an Environmental Protection Agency (EPA) consultant, told the Senate Commerce Subcommittee on the Environment that PCB contamination "is more widespread," and that "some concentrations are higher than previously believed".

In recent months EPA investigators have reported that Hudson River fish contain as much as 350 parts per million of PCBs on a whole bodyweight basis—far exceeding the 5 ppm maximum laid down by the US Food and Drug Administration.



Buckley told *New Scientist* that two loopholes in the 1972 measures have been exploited to subvert the agencies' intent. One is that the import of PCBs was not banned. According to EPA sources, over 375 000 pounds of PCBs are imported from Europe and Japan into the US every year. The second gap is that companies contracted to dispose of used PCBs sell them second-hand for "illicit" uses.

The impact of the EPA's admission of failure was heightened by its revelation that so far unpublished research has produced some evidence of the carcinogenicity of at least one PCB. In 1973, Professor James Allen and D. H. Norback of Wisconsin University published evidence that PCBs caused changes in the stomach lining of monkeys suggestive of cancer formation (*New Scientist*, vol 57, p 289). Professor Allen told *New Scientist* that more recently he has isolated a carcinogenic intermediate metabolite of PCBs in monkeys. "As far as the primates are concerned, the potential [of PCB carcinogenicity] is there," said Allen.

He has also discovered other maleffects of PCBs on rhesus monkeys, apparent even at intakes as low as 2·5 ppm of diet. When dosed with 5 ppm PCB in diet, for example, only one out of an experimental group of eight pregnant monkeys carried its infant to term. Monkeys fed PCBs in their diet lose weight and hair, develop acne, and have irregular menstrual cycles.

It was while investigating these effects—this time in female rats—that Renate Kimbrough at the Center for Communicable Disease in Atlanta made the latest, and most disturbing, discovery. She fed 400 rats (200 controls) 100 ppm of Aroclor 1260 (a US brand of PCB) for almost two years. Of 184 surviving animals in the experimental group, 26 had liver (hepatocellular) tumours, and 144 showed neoplastic nodules—structures in the liver that Dr Kimbrough says are probably precursors of hepatocellular tumours. Only one liver tumour was found in control group animals.

Dr Kimbrough stressed that, relative to body weight, these doses are very much higher than those likely to be taken by humans. Buckley was also cautious, pointing out that not everyone eats fish (the largest source of PCBs in human diet) and that fish-eaters do not necessarily eat fish from contaminated areas. Nevertheless, he added, "I would feel uncomfortable eating fish with 300 ppm of PCBs". And Kimbrough thinks that her results indicate the need for a re-assessment of the risk to workers exposed to PCBs.

Coping with an expanded Wimmix

One of the best mirrors to more permanent trends in computer activity is the US General Accounting Office. This year GAO has faithfully come to grips with major concerns.

Its most interesting report examines the need for security in World-Wide Military Command and Control System, known as Wimmix. The system consists of 35 Honeywell 6000 series machines costing about £50 million. It is moving toward network operation, which means that shared software and classified data bases must be protected from the security threat presented by remote interactive working from terminals in the net. Multi-level security is needed and at reasonable cost. GAO does not think that present Wimmix programs are capable of being secured. It is also worried by the fact that current approaches are tied to Honeywell machines.

GAO suggests a shift to new control programs, upgrading existing programs only for urgent operational needs. It reckons that shifting to a data base system that can be run on several machine types will cost about £350 000. Such a "portable" system could, however, be used under a better control program to achieve a basic two-level security system.

In two other reports, GAO turns its attention to the chances of saving large sums for the US taxpayer. It believes, for example, that insufficient notice is being taken of the used computer market. And suppliers of small computers and independent peripherals are not being given enough of a chance to show their paces when bidding for contracts.

A special report for the Government Printing Office reverts to basics. The printing office's three IBM machines, says GAO, are highly underused. An IBM 360/50 processor was used only to a third of its rating and a 360/65 processor was employed to less than 19 per cent of capacity. By switching control programs it looks as if a third machine—a 360/40—could be sold and the remaining two made to do more work than was previously done by all three machines.

A new water quality monitoring network is now operating in the United States. The National Stream Quality Accounting Network (NASQAN) is run by the US Geological Survey; it has 345 stations that measure 46 physical, chemical, and biological water quality characteristics. Measurements are made either continuously, daily, monthly, or quarterly.

NASQAN sites are chosen to reflect the US Water Resource Council's hydrological sub-divisions. The Council has divided the US into 23 regions, 220 sub-regions, and 324 "accounting units". The USGS runs most of the water monitoring stations; and the samples of water are analysed in USGS laboratories. The measurements from the NASQAN network will be published annually as basic data reports on a State by State basis. There will also be a yearly report on the US's surface water quality. More long-term changes will be covered in a series of reports published every three to five years.

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