

SECTOR GROUP ON UNINTENDED OCCURRENCE
OF CHEMICALS IN THE ENVIRONMENT

Polychlorinated Biphenyls
Proposals for Concerted Action

INTRODUCTION

1. Polychlorinated biphenyls (PCBs) are a group of stable substances comprising theoretically more than 200 individual compounds, many of which are widely used particularly because of their dielectric properties and non-flammability. At present they are obtained through chlorination of diphenyl, resulting in mixtures that are characterised by their average content of chlorine. Due to the persistence and toxicity of some of these compounds, effects have been observed in the environment and accidents reported over the last few years, which have given rise to serious concern in Member countries. In view of this concern, the Sector Group on Unintended Occurrence of Chemicals in the Environment has investigated, on a priority basis, the need for, and feasibility of, concerted action to control the use and emissions of PCBs. The results of this enquiry, which have been presented in document NR/ENV/72.49, lead to the following conclusions :
 - a) Because of unacceptable levels of PCBs found in the environment and because of a number of incidents involving human health, some countries have taken, or are considering taking action to control the use of PCBs;
 - b) There are (1972) only six companies in OECD Member countries that manufacture PCBs; four of them have already taken steps to reduce production to the supply for a few approved uses;
 - c) PCBs can be replaced except for some uses where their dielectric properties and non-flammability are essential;
 - d) The technology for destruction of PCBs exists;
 - e) Because of the many applications of PCBs in the wide range of consumer products moving in international trade, the situation will almost certainly become complicated unless international agreement is reached on allowable uses;

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- f) A rough estimate* indicates that consumption of PCBs in OECD countries is matched by production. Considering in addition that import of chemicals from non-OECD to OECD countries is still restricted to basic chemicals, import of bulk PCBs is unlikely. It is, therefore, reasonable to suggest that the major part of the problem of unintended occurrence of PCBs can be solved through concerted action between OECD Member countries.

USES OF PCBs

2. The applications of PCBs fall mainly into two categories :
- uses in closed systems
 - dissipative uses.

Closed Systems

3. The use of PCBs in closed systems can be defined as application from which the PCBs are recoverable. PCBs in transformers, capacitors, heat transfer systems, hydraulic equipment, and vacuum pumps are in principle recoverable, since during use, the PCBs are not generally dispersed into the environment.
4. It is, however, important to distinguish between closed system uses that are controllable in practice and those where control cannot be guaranteed either
- because frequent replacement of relatively small quantities will lead to disposal rather than recovery, or
 - because a large number of small units widely dispersed will make collection extremely difficult, or
 - because accidental leakage will cause imminent danger to human health.
5. A truly controllable use may therefore be defined as an application where
- the PCBs are contained in a sealed circuit in large, long life units,
 - the quantities involved are such that there is an incentive for regeneration.

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* Production in 1971 amounted to about 48,400 metric tons and consumption in the 13 countries that provided numerical information to about 35,300 tons; assuming that consumption of PCB is likely to be in some measure proportional to GNP, consumption in the other ten countries (Austria, Denmark, Greece, Iceland, Ireland, Italy, Japan, Luxemburg, Spain, Turkey) would be in the order of 7,400 tons.

6. Following what has been said above, the only truly controllable uses of PCBs are in dielectrics for transformers and for large capacitors for power factor correction. Preventing escape of PCBs from these applications is mainly a problem of engineering design and of collection and destruction of used liquids, or, in the case of capacitors, of removal and destruction of PCB-impregnated material. These uses also being essential for safety reasons, it would be unreasonable to suggest that they be discontinued at the present time.
7. In all other closed systems, recovery of PCBs, although theoretically possible, would not be practical. Such applications should, therefore, be discontinued, unless safety requirements prevent the use of substitute products :

(i) Heat transfer systems

There may be some installations where the risk of explosion or fire must be avoided at all cost, and the danger of some escape of PCBs therefore is of less importance. Because of the risk of leakage, which can never be totally guarded against, the use of PCBs as heat transfer media in the food, drugs and feed industries should, however, be prohibited.

(ii) Hydraulic equipment, vacuum pumps

Although the quantities involved in the individual case are relatively small, they will, unless recovered, add significantly to the environmental burden of PCBs. Theoretically, used fluids could be recovered, but in view of the difficulty of establishing a system to collect small quantities from many users, these applications should be discontinued. Furthermore, PCBs are generally not essential in hydraulic and pumping fluids, with the possible exception of hydraulic equipment in underground mining.

(iii) Small capacitors

These are typical examples of an application of PCBs in sealed units that are almost completely non-recoverable. Considering, for example, the many domestic electrical appliances in which capacitors are used, the cost of recovery would probably be prohibitive. A warning label showing that the equipment must not be disposed of as ordinary waste has been suggested; it is however, not likely to be sufficient, unless manufacturers and retailers would accept return of appliances that are out of use. The problem remains unresolved at the present time, but it has to be noted that one country has already banned the use of PCBs in the manufacture of small capacitors.

Dissipative Uses

8. The dissipative uses are those where recovery of used PCBs is not possible, since they are not contained in closed systems but in direct contact with the environment

(i) Lubricating and cutting oils

The conditions under which these oils are used are such that there is continuous emission of small quantities into the environment. These applications, not being essential, should be discontinued;

(ii) Pesticide Use

This use has fortunately been abandoned in most countries already; if not, it should be banned with immediate effect. Since all OECD countries require registration of pesticides, such a measure can easily be taken under existing legislation;

(iii) Plasticizers

The most important category, by volume, of dissipative use is in the field of plasticizers. They are or have been used in most countries in a wide variety of consumer products including paints, inks, copying paper, adhesives, sealants, plastic products, etc., many of which are traded internationally. The major applications seem to be in the printing and paint industries.

9. The Printing Industry : Because of the risk of contamination of paper, which after recycling may be used in food packaging, the use of PCBs in the printing industry should be banned. In view of the fact that printing inks can be produced without PCBs and that in any case the production represents a total value of only about \$ 30 million in OECD countries, such a measure should not cause serious economic damage. Assuming that copying paper is usually provided by the copying machine manufacturers (relatively few and big companies), any economic effects should be small.

10. The Paint Industry poses a somewhat different problem. Over the last decade, production has increased by 3.5% - 5% annually and the trend is rising in the OECD area. The over 2,000 million dollar West European paint industry alone accounts for some 40% of the world output. Production is assured by a few large and a great many small companies (U.K. = 480, Italy and France = 350 etc.). This picture suggests that an overall ban on PCBs in paints could have some economic consequences.

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It appears, however, that where used, (e.g. in stoving applications) PCBs constitute something like 5 - 10% of the paint. Few details are available in respect of the amounts used in paints, but taking one example (France) where 250 tons were used (1971) in a paint industry that produced something like 700,000 tons of paint, presumably only 2500-5000 tons would contain PCBs. Considering in addition that small paint manufacturers are generally highly specialized, and that the manufacturing process would not have to undergo a major change to replace the use of PCBs, a ban on PCBs should not cause any serious disturbance. The use of PCBs in paints has, in fact, been discontinued in some countries already. Figures for production (8,654,200 tons in 1969) and consumption (8,517,500 tons) in OECD countries again suggest that import of paints from non-OECD producers may be of minor significance.

11. In practice, none of the products where PCBs have been used as plasticizers can be recovered. Unless the use is totally eliminated, there will be continuous emissions into the environment due to evaporation, insufficient incineration etc. Judging by the action already taken in several countries, substitutes can readily be found for the whole category of plasticizer use of PCBs, which should, therefore, be banned.
12. It follows from what has been said above that for adequate protection of health and environment, but also to avoid undue competition in international trade, agreement is necessary on allowed uses of PCBs. In order to ensure that home production is not substituted by import, control action by governments through licencing or other means, is essential.
13. Measures are further necessary to ensure collection of used material, safety in transport of raw PCBs, and assessment of substitute materials :
 - a) In order to ensure collection of PCBs from all installations where their use must continue, manufacturers and/or importers should be required to keep inventory of all amounts supplied, recovered, regenerated and destroyed. Such inventories must be open to government inspection.
 - b) A uniform labelling system, internationally recognisable, should be developed for use on containers of raw PCBs as well as on any equipment or product containing PCBs.
 - c) Suppliers (i.e. manufacturers and importers) should further provide containers for the transport of PCB-containing liquids : such containers must meet the appropriate specifications that have been laid down to ensure safety in transport of dangerous chemicals.

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- d) Development of substitutes that are less hazardous than PCBs* should be encouraged, but in view of the fact that no system for pre-market control of new chemicals has been introduced, testing for environmental effects is so far entirely the responsibility of the manufacturers. Information on replacement products should, therefore, be collected and reviewed.

ACTION PROPOSED

4. The Sector Group on Unintended Occurrence of Chemicals in the Environment

- in pursuit of the objective of elimination of all escape of PCBs to the environment,
- whilst recognising that all Member countries may not presently have adequate legislation and may have to seek other means of compliance,

proposes that the Council of the OECD seek the strongest possible agreement between Member governments :

- a) that PCBs be limited, except as provided in para.c)hereof, to the following categories of use, however only in those applications where requirements for non-flammability supersede those of environmental protection and where sufficient control is possible :

Dielectric fluids for

transformers

large power factor correction capacitors,

Heat transfer fluids

other than in installations for the processing of foods, drugs, feeds and veterinary products,

Hydraulic fluids in

mining equipment;

- b) that for all PCB-uses the following procedures be established :

- (i) control of the manufacture, import and export of bulk PCBs, including also PCB-containing products as far as useful and practicable;
- (ii) the institution of adequate arrangements for the recovery, regeneration, adequate incineration or other safe disposal of surplus and waste materials;

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* As of the time of the preparation of this report, limited research studies with certain selected PCB-compounds may indicate that some of these compounds could eventually safely be used as replacements for certain applications.

- (iii) the institution of a special, uniform labelling system for both raw PCBs and PCB-containing manufactured products;
- (iv) safety specifications for containers and transport;
- c) that Member countries work towards the elimination of PCBs from small capacitors. It is however recognised that at present this is unattainable. While their use continues, it is understood that it would be impracticable for them to be subject to the recommendations dealing with labelling and disposal. The problem should be kept under review by the Sector Group on Unintended Occurrence of Chemicals in the Environment;
- d) that all other applications of PCBs be eliminated, giving priority attention to :
- heat transfer fluids in the food, pharmaceuticals, feed and veterinary industries,
 - plasticizers for paints, inks, copying paper, adhesives, sealants,
 - hydraulic liquids (other than in mining) and lubricating oils,
 - vacuum pump fluids and cutting oils,
 - pesticide uses;
- e) that Member countries request their industries to use as PCB replacements materials which pose a lower hazard to human health and the environment than do the PCBs;
- f) that information be exchanged at the beginning of 1974, 1975 and 1976 on
- (i) amounts of PCBs, including :
- | | | |
|----------------------------------|-----|----------------|
| amounts manufactured by PCB type | | |
| amounts imported | " " | and by country |
| amounts exported | " " | and by country |
| amounts incinerated | " " | |
| amounts consumed | " " | and by use; |
- (ii) details of PCB replacements including :
- identification,
 - total amounts for each chemical type and for each use,
 - known toxicity and environmental hazard of each chemical type;

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(iii) details of disposal of surplus PCBs, (by incineration or by other means), including evaluation of incinerator efficiency;

g) that implementation of measures adopted be reported regularly to Council.

15. Finally, attention is called to the desirability that appropriate steps be taken to eventually open any agreement between OECD Member countries for adherence by non-OECD nations.

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