WORKING DRAFT

PCB EFFLUENT STANDARDS

I. DEFINITION OF POLYCHLORINATED BIPHENYLS

Commercial chlorinated biphenyl products, of which Aroclors are examples, are produced by direct chlorination of biphenyl, the degree of chlorination being chosen to provide desired properties. These materials are inert, chemically resistant, readily soluble in most common organic solvents, and have water solubilities on the order of 25-200 ppb. These products are in all cases multicomponent mixtures and not single entities as implied by the commonly employed acronym PCB. In fact, the commercial mixtures can theoretically have as many as 211 different components containing 0-10 chlorine atoms per biphenyl molecule.

While it is well understood and accepted that each chlorinated biphenyl isomer has a unique set of physical and chemical properties, it is apparently not understood that each isomer also bioaccumulates and biodegrades at a different rate.

This lack of understanding is amply reflected in the definition proposed in the EPA Toxic Pollutant Effluent Standards (FR 38, #247, p. 35393, sec. 129.09a) and we quote: "As used in this subpart, the term:

> Polychlorinated biphenyls (PCBs) means materials containing the biphenyl group which have been chlorinated to varying degress. There are 210 possible different PCB compounds."

We object to this definition because it implies that all chlorinated biphenyl isomers are of equal environmental concern, i.e., that they all persist and bioaccumulate in the same manner in our environment. It has been well established by academic, government, and industrial researchers that this is simply not true. Environmental monitoring programs have clearly demonstrated that, with the exception of direct high level controllable release near points of manufacture or use, that the PCBs found in our environment are the more highly chlorinated ones, i.e., those containing predominantly 5 or more chlorine atoms per biphenyl molecule (1-13).

This is true even though the lower chlorinated biphenyls have constituted >65% of all the PCBs manufactured over the years. This is strong evidence that the less chlorinated isomers degrade rapidly. It further suggests that even under conditions of unrestricted use, and without special precautions to prevent release into our environment (which is truly not the case now), that the less chlorinated materials degrade rapidly enough to prevent bioaccumulation.

More recently, it has also been demonstrated in laboratory experiments that chlorinated biphenyl isomers, readily undergo bacterial degradation at rates dependent upon the number of chlorines per biphenyl-molecule (17, 18, 19, 20 and 21). There are also good indications that ambient environmental PCB levels are decreasing at rates more rapidly than predicted (14, 15,16).

On the basis of these data we believe it to be unrealistic to consider all chlorinated biphenyls equivalent in terms of persistence and bioaccumulation as does the proposed regulation. We therefore suggest that, for environmental purposes, the definition of PCBs focus upon those which are truly of concern and we recommend that a more suitable definition would be:

> "Polychlorinated biphenyls (PCBs) means materials containing the biphenyl group which is chlorinated and which have been shown to persist and rapidly bioaccumulate in the aquatic environment. These chlorinated biphenyls are identified as those components having gas chromatographic retention times greater than 54, relative to p,p-DDE = 100, under the standard conditions recommended in the EPA PCB test method."

In suggesting this definition, we want it understood that we are not proposing the unrestricted release of the lower chlorinated biphenyls. We only suggest that the data indicates that our environment has shown the capability of handling these materials when large amounts were unknowingly released and that this coupled with the industrial restriction of sales to critical non-dispersive uses, with emphasis on recycle and proper disposal, has already brought this aspect under control.

EST:db
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15. Statement obtained from Dr. George Harvey, Woods Hole Oceanographic Institute 1-9-74; permission to quote given.

    "In the summer and fall of 1972 the surface waters of the Eastern and Western North Atlantic ocean had an average PCB concentration of 30 parts per trillion. By the summer and fall of 1973, the average PCB concentration in the same areas had decreased to about 1 part per trillion.

    "Since the suspended solids fall out and mixing rates of the ocean are constant, the observed reduction in surface layer concentrations indicate a reduced PCB input."

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