October 14, 1969

O. W. Berg, Ph.D.
Chemistry II Branch
Ontario Water Resources Commission
135 St. Clair Ave., W.
Toronto 7, Ontario, Canada

Dear Dr. Berg:

Thank you for your letter of October 1, requesting information concerning the polychlorinated biphenyls. I was out of the office last week when it arrived so I apologize for the delay in my reply.

In connection with the toxicity of these compounds, Enclosure I is a table showing the physical and chemical properties of our polychlorinated biphenyls and terphenyls--designated by their trademark, "Aroclor". At the bottom of the page we have typed in the acute toxicity data as determined in range-finding toxicity studies with rats and rabbits. These data indicate that the PCB's are not seriously toxic from the standpoint of acute exposures.

Enclosure II is a reprint showing the results of chronic vapor inhalation experiments on Aroclors 1242 and 1254 which have led to a Threshold Limit Value for industrial exposures of 1.0 mg and 0.5 mg per cubic meter of air respectively.

Enclosure III is an Industrial Hygiene Guide which summarizes information relative to the safe handling and usage of these compounds in industry.

Since the interest in the appearance of PCB's as an interfering substance in the analysis of chlorinated pesticide residue analysis has arisen, we have undertaken a considerable research effort which includes two year chronic feeding studies in rats and dogs and a three generation rat reproduction study. Interim

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reports on these studies on Aroclors 1242, 1254 and 1260 indicate that, at the end of 90 days, there are no significant abnormalities noted in pure-bred beagle dogs at dietary levels of 1, 10 and 100 ppm as indicated by the following parameters: body weight, food consumption, reactions, mortality, hematologic studies, blood chemistry studies and urine analysis.

In the case of the two year study with rats, we included an additional 300 animals which will permit sacrifice of some at intervals during the study. The initial 90 day report on the rats indicate results similar to the above, but, of course in this instance, we will be able to get micropathology data which we are awaiting.

In the three generation rat reproduction study, "Fo" parental animals are being mated for first or second litters. As of September 15, live birth and 24 hour survival indices of "F1a" litters compared favorably with controls.

We believe all of the data to-date indicate that the PCB's do not pose a serious toxicity hazard to mammals including man. We recognize that the studies underway are of a "classical" nature normally undertaken to provide data for the establishment of safe levels of intake usually associated with indirect food additives or pesticide tolerances.

In connection with the Aquatic Biota, we believe our efforts must be directed at eliminating any possible sources of the PCB's entering the environment. In this connection, we are supporting such research efforts as undertaken by the Wisconsin Alumni Research Foundation which is attempting to pinpoint possible sources of contamination of Lake Michigan by the persistent chlorinated pesticides and PCB's.

I personally have not been involved with chemical laboratory analysis for a number of years but I certainly can appreciate that the presence of PCB's in residues can make life miserable.

I am sure you know that the commercial PCB's are made up of mixtures of many isomers rather than being pure compounds. Enclosure IV is a paper given us by Prof. Widmark which discusses the possible or theoretical distribution of isomers in producing a biphenyl with five chlorine atoms. Although I'm sure this is elementary to you, it is included to point out the difficulty in making available "pure" isomers for analytical references or standards.

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Enclosures V and VI were also given to us by Prof. Widmark and indicate some of the difficulties which have been encountered in making positive identification in some cases of the PCB's as "culprits" in the pesticide residue interference problem. I'm sure you are familiar with this work done by the Institute of Analytical Chemistry, University of Stockholm, but since the original work by Widmark and Jensen has not been published in its entirety, perhaps these copies will be of interest.

I note that I have neglected to point out that the numerical designation of our Aroclors is meaningful. The 1200 series of compounds are biphenyl chlorinated to the percentage indicated by the last two numerals. Thus, Aroclor 1254 is biphenyl chlorinated to 54%. The 5400 materials are terphenyls chlorinated to the percentage indicated by the last two digits. Aroclors 4465 and 2565 are mixtures of biphenyls and terphenyls chlorinated to 65%.

Very truly yours,

Elmer P. Wheeler
Manager, Environmental Health

EPW:ju

Enclosures

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