February 15, 1960

Arochlors

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Dear Anna:

In answer to your letter of February 11, I believe Henry Smyth was talking about our chlorinated diphenyls or Arochlors rather than chlorinated diphenol. It was the former series, along with the chlorinated naphthalenes, that was involved in the Halowax difficulties in the mid and late 30's. You will recall that in the impregnation of wire coatings with heated Halowax in open, unventilated tanks, a number of workers suffered liver damage and there were some fatal cases.

Dr. Cecil Drinker did a considerable amount of animal toxicity work with the components of the Halowax including the chlorinated naphthalenes, chlorinated diphenyls and chlorinated diphenyl oxides. Dr. Kelly represented Monsanto as a company which manufactured some of the components of the Halowax and a co-sponsor of the Harvard project.

In the late 40's, Dr. Kelly began to question the validity of the results reported in the Harvard work as it related to the Monsanto materials. His questions arose, I believe, because following the Halowax episodes, industrial experience with the chlorinated diphenyls, used alone, had been without incident. Although the trouble-free years could be due to continual pressure on the part of our representatives to educate customers and prevent undue exposures, we did feel that not all recommended precautions were followed in all cases and yet we were not hearing of any difficulties.

In discussing this problem with Henry Smyth on one occasion, he asked me what we had done to make the diphenyls "less toxic". I believe he stated further that he had done some animal work on the chlorinated diphenyls from time to time and it appeared

that the effects on animals were less noted in recent years. To my knowledge, we have made no changes in our production practices which might change the physiological characteristics of the products.

I have enclosed a reprint of some work done by Joe Treon on two of the Aroclors which indicates that the threshold limits recommended following Drinker's work were certainly on the safe side. Perhaps at this point, I should mention that in the Aroclor products, the twelve hundred series represents chlorinated diphenyls; the fifty-four hundred series represents chlorinated terphenyls; and the others are mixtures of chlorinated diphenyls and terphenyls. As pointed out in the Treon work, Aroclor 1242 is diphenyl chlorinated to 42% and Aroclor 1254 is diphenyl chlorinated to 54%.

It is our feeling that any of the chlorinated diphenyls or terphenyls may cause chloracne and liver damage if exposures are prolonged and severe enough. On the other hand, we do not think the hazard is as great as might be predicted on the basis of the early Harvard work.

If your interest is in chlorinated diphenol, I can give you only the following range finding toxicity data: The sample which was investigated showed an oral LD_{50} in rats of 785 milligrams per kilogram when administered as a 10% solution in corn oil. Applied to the skin of rabbits as a 25% solution in corn oil, the minimum lethal dose was between 2500 and 3250 mg/kg. The skin and eye irritation potential studies with rabbits indicated that the sample was not significantly irritating.

I have enclosed a bulletin indicating the physical and chemical characteristics of the chlorinated diphenyls. The chlorinated diphenol has not developed as a large commercial item although there has been some interest in sample quantities recently.

If I can be of any further assistance, please let me know.

Sincerely yours,

Elmer P. Wheeler
Assistant Director
Medical Department

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Enclosures 2

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P.S. Questions in our minds concerning the early work at Harvard relate to the proper identification of samples studied in their animal work. The published reports mention "Arcolor" and/or "chlorinated diphenyl" materials which we were unable to identify. The samples were not provided by our Company.

EPW