cc Paul Benignus-GO

October 23, 1959

AIR MAIL

Mr. H. Wilbur Speicher
Administrator, Industrial Hygiene
Westinghouse Electric Corporation
East Pittsburgh, Pennsylvania

Dear Wilbur:

Thank you for your letter of October 21 inquiring about the safe use of trichlorodiphenyl and a mixture of 40% trichlorobenzene and 60% hexachlorodiphenyl.

We market trichlorodiphenyl as "Aroclor 1242". The combination of hexachlorodiphenyl and 40% trichlorobenzene is known as "Inerteen PPO". The diphenyl in this combination is our "Aroclor 1260".

The physical and chemical properties of the Aroclors mentioned are shown on the table on pages 4 and 5 of the enclosed Aroclor bulletin. Enclosed also is a reprint indicating the results of chronic toxicity studies with Aroclors 1242 and 1254. The following comments answering your questions serially are based on information contained in these bulletins.

I believe prolonged and repeated skin contact with any of the Aroclors should be avoided for two reasons. In the first place, the less chlorinated products are liquids and are excellent solvents for oils and fats in the skin as well as other organic materials. Secondly, it is possible that prolonged or repeated skin contact could lead to chloracne. I know of only two cases where such experience has developed during the long history of production and use of the Aroclors. In one case, an Aroclor was being used as a heat transfer medium in a system that allowed vapors to escape when the material was heated to 600°F. Several workmen developed "blackheads" which were found by an industrial physician but which in his words were so insignificant that the men were not aware of them nor would a general practitioner notice them. This indicates to me, however,

that sufficient exposure, whether by inhalation of vapors or skin contact, can result in chloracne which I think we must assume could be an indication of more serious systemic injury if the exposure was allowed to continue.

A second case of mild chloracne about which we have any knowledge resulted from workmen dipping their hands in the liquid Aroclor as if it were mineral oil or vegetable oil. In addition, their clothing sooner or later became impregnated with the material and thus exposure was magnified.

You asked at what temperature local exhaust ventilation should be provided. Although the distillation range for Aroclor 1242 is 325-360°C. and 385-420°C. for Aroclor 1260, I feel that good practice dictates that local exhaust ventilation be provided when any of the Aroclors are heated above 150°F. in open tanks or in any systems where the material is not in a completely enclosed system (vapor-proof tanks, kettles, pumps, piping, etc.). This may be ultra conservative because as the distillation ranges and vapor pressure curves (page 12 of the Aroclor bulletin) indicate, the loss of vapors at 150°F. should not be significant except in any work area where general ventilation or air changes do not exist.

Your next question related again to possible skin and systemic effects and I believe it is answered above.

In connection with the 40% trichlorobenzene-60% Aroclor 1260 combination, I believe the thoughts expressed above also apply. I understand that the trichlorobenzene which is used is a mixture of the 1,2,3-, 1,2,4-, and 1,3,5-isomers which will begin to distill at 205°C. Again, I believe this indicates a low vapor pressure for the solvent at room temperatures. The only reference we have to trichlorobenzene toxicity is contained in the Public Health Service Publication No. 414 entitled "The Halogenated Hydrocarbons Toxicity and Potential Dangers" by Dr. W. F. von Oettingen, U.S. Government Printing Office, 1955 (pages 297-298). Dr. von Oettingen refers to some work done in 1937 which indicated that the trichlorobenzene was less toxic than mono or dichlorobenzene. In my opinion, a reasonable MAC for this material would be 100 parts per million.

The enclosed publication on the toxicity of Aroclor 1242 and 1254 suggests an MAC for 1242 of 2 milligrams per cubic meter which is twice that recommended by the ACGIH for a chlorinated diphenyl of unstated chlorine content. In the case of 1254, the publication suggests that the MAC of 1 milligram per cubic meter "recommended tentatively for safe industrial practice by the American Conference of Governmental Industrial Hygienists" is reasonable. On the other hand, reference to Henry Smyth's Cummings Memorial Lecture of 1956 in which he discussed the basis for the then existing "hygienic standards" indicates that

Henry agrees that MACs of 1 mg/cu.m. for Aroclor 1242 and 0.5 mg/cu.m. for Aroclor 1254 are more realistic. In the absence of any chronic toxicity data on Aroclor 1260, we suggest an MAC of 0.5 mg/cu.m., the same as in the case of 1254.

I have been in one plant where these materials were used for capacitors and transformers. The care and handling and the provisions of exhaust ventilation were not in accordance with the thoughts expressed above. The only reported difficulty was some mild eye irritation when impregnation cabinets where the items were heated to 110-120°C. released vapors of trichlorobenzene and the Aroclor into the workroom when the cabinet doors were opened. In my mind, such cabinets should be ventilated to remove the vapors rather than allow them to be released into the working atmosphere.

I have been told that your company has had some 20-25 years' experience with the products discussed above. It was suggested that Mr. James B. Ford, manager of transformer manufacturing engineering at your Sharon Plant would be a source of information regarding experience with Inerteen PPO. Similarly, Mr. R. E. Marbury of your Bloomington, Indiana Plant has been associated with the use of Aroclor 1242. Perhaps you have already discussed potential exposures with these gentlemen. If so, I would be interested in learning of their practical experience with these products.

I look forward to seeing you in Pittsburgh next week.

Sincerely,

Elmer P. Wheeler
Assistant Director
Medical Department

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