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February 10, 1964

Dr. William L. Sutton
Eastman Kodak Company
Rochester 4, New York

Dear Bill:

In reply to your letter of February 3 I have the following information relative to Therminol FR-1.

We do not advertise the composition of this heat transfer agent but I can tell you that it is a refined grade of Aroclor 1242. Thus it is diphenyl chlorinated to the extent of 42%.

Don Irish's discussion of the chlorinated diphenyls in Patty's Volume II is a good summary of the literature. To our knowledge the chlorinated diphenyls are not used very frequently today mixed with the chlorinated naphthalenes. The early reports in the literature of the difficulties with chlorinated hydrocarbons painted the chlorinated diphenyls with the same black brush used to describe the chlorinated naphthalenes. Cecil Drinker's work, referred to repeatedly in the literature, was done nearly 30 years ago and included sample identification which was not consistent with our designations. Even though Monsanto contributed to the financial support of Drinker's investigation, Dr. Kelly has always been a little skeptical about some of the published data.

We are more inclined to rely on Joe Treon's animal data and his evaluation of the potential hazard based on that data. Although you probably have seen Joe's publication, I am enclosing a reprint.

The Medical Department is not aware of any liver injury or acneiform dermatitis which has resulted from the use of Therminol FR-1. In the history of use of Aroclor 1242 as a heat transfer agent Dr. Kelly has heard of only two cases of transient liver effects where workers were exposed for 2-3 days to vapor concentrations that reportedly were not too discomforting although the typical odor was perhaps "unpleasant". My own feeling is that odor does offer a sufficient warning indication of excessive exposures. On the basis of odor I would say that any level which is more than barely perceptible is unsatisfactory from the standpoint of repeated exposure. As far as single exposures are concerned, I don't think it makes good sense for workers to be exposed to a level where the odor is "strong" even though not irritating. I realize these are pretty amateur descriptions but it is the only way I know how to answer your specific questions about warning properties.

The fact is that we recommend that these heat transfer agents be used in equipment where there should be no exposure to vapors. To accomplish this for example it is recommended that piping joints be welded rather than threaded and coupled. The surge tank in the system should be vented outdoors. It is my understanding that pumps can be provided so that there is no leakage through the glands. It would seem that the only possibility of exposure would be as the result of an accident and since the system is operated at essentially atmospheric pressure, the possibility of line breakage should be quite remote.

Since the early difficulties with the chlorinated diphenyl-chlorinated naphthalene mixtures during the 1930s, there has been only one instance that I know of where acneiform dermatitis resulted from the use of an Aroclor as a heat transfer agent. I have enclosed a copy of the report of this instance as it was presented in the JAMA. Enclosed also is a statement by Dr. Kelly after the exchange of several pieces of correspondence with Dr. Meigs.

If you think there is anything I can add to these comments, please do not hesitate to let me know.

Best personal regards,

Very truly yours,

Elmer P. Wheeler, Manager
Environmental Health
Medical Department

EPW:mjb
Enclosure